

Technology Dept.

*February • 1957*



# **M**etal **P**roducts **M**anufacturing

*including finish* \_\_\_\_\_

SERVING THE  
*Appliance* AND  
FABRICATED METAL PRODUCTS INDUSTRY

FROM RAW METAL TO FINISHED PRODUCT

# EPON<sup>®</sup> RESIN does it!

## Tough primer on RCA WHIRLPOOL Washers

withstands rugged  
washday punishment



RCA WHIRLPOOL Washer cabinets on storage conveyors. Finish system includes an Epon resin undercoat, formulated by Grand Rapids Varnish Corporation.



Epon resin-based finish plus careful inspection eliminate customer complaints.

## HERE'S HOW...

SOAPS AND MODERN high-strength detergents are persistent enemies of ordinary paint. Because of severe corrosive conditions in some geographical areas, home laundry appliances often show rust stains in just a few weeks of service.

Whirlpool-Seeger Corporation, St. Joseph, Michigan, has found that a primer based on Epon resin gives an outstandingly superior protective finish to its washers, driers, and other home laundry equipment. To maintain the highest standards for coatings, Whirlpool-Seeger set up a system of continuous quality-control testing in their finishing section.

*Epon resin-based primers, now standard on RCA WHIRLPOOL Washers, are credited with all but eliminating a major source of field complaints about coating failures.*

If you have a product finishing or paint maintenance problem, you, too, may find that Epon resin-based coatings will do the job better. They have excellent adhesion, high resistance to impact and abrasion, outstanding resistance to moisture, heat, and corrosives. Ask your supplier for Epon resin-based paints and enamels. Write for the full Epon resin coatings story: "Planning to Paint a Pyramid?"

*Epon resins are the epoxy polymers made exclusively by Shell Chemical Corp.*



### SHELL CHEMICAL CORPORATION

#### CHEMICAL SALES DIVISION

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New York 17, New York

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Cleveland • Detroit • Houston  
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## **Every surface is a work surface when it's Porcelain Enameled**

Every porcelain enameled surface in the kitchen . . . drain boards, range tops, dishwasher tops, cabinet tops, and many others . . . provides a work area. That's one important reason why busy housewives prefer appliances with this beautiful lifetime finish.

Porcelain enameled finishes make good work surfaces because this dense, glass-like material resists food acids, scratching, heat, and thermal shock. Ordinary soap or household cleaners keep porcelain enamel clean, sanitary, and free of stains.

What's more, porcelain enamel won't fade, stays color-fast. An infinite variety of colors and shades is now available.

### **QUALITY BASE METAL**

For more than 40 years, porcelain enameled have been specifying Armco Enameling Iron for the base metal because of its uniform flatness and bonding characteristics. During that time it has become known as the

### **"World's Standard Enameling Iron."**

If you would like to consider giving *your* products all the sales advantages that go with a porcelain enamel finish, let us send you our catalog, "Armco Enameling Iron." This informative booklet contains helpful tips on fabricating, welding, cleaning, pickling, and porcelain enameling. Just fill in and mail the attached coupon for a free copy.

#### **ARMCO STEEL CORPORATION**

2346 Curtis Street, Middletown, Ohio

Send us your catalog, "Armco Enameling Iron"

We manufacture \_\_\_\_\_

Name \_\_\_\_\_

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## **ARMCO STEEL CORPORATION**

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Sheffield Steel Division • Armco Drainage & Metal Products, Inc. • The Armco International Corporation





***Chef-o-Matic***

## **SURFACE ELEMENT TEMPERATURE CONTROL**

### **IS BEST FOR YOU AND YOUR RANGE CUSTOMER**

When selecting the automatic surface element control for your electric range, consider these significant features of the King-Seeley system:

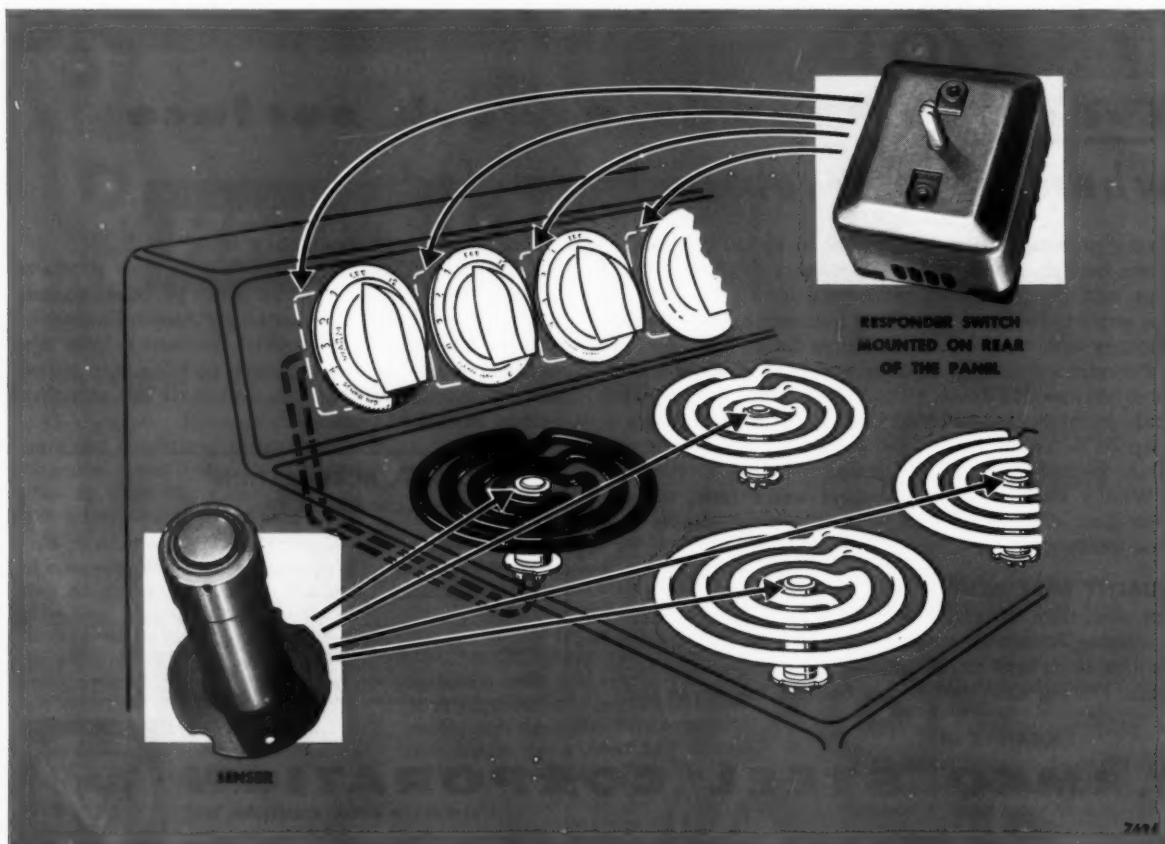
- Temperature control range—100°F to 450°F
- Infinite number of precision settings within the temperature range, on a linear scale, in either knob rotation direction
- Quick response and recovery, dependable repeatability
- Anticipating feature of proportioning control limits over-shooting
- Accurate control in the Warm, Boil and Fry ranges
- All electric units with wire connections only—no tubes or other mechanisms to fuss with
- All units completely interchangeable
- Controls any wattage up to 3000 watts
- Expensive dual wattage elements not necessary

- User safety assured by low voltage system between sensor and responder switch
- Only one transformer for any number of surface units
- Automatically reduces wattage when cooking utensil is taken off surface element
- Rugged sensor—withstands up to 800°F
- Economical and easy to install

**MAKE YOUR OWN COMPARISONS  
OF PERFORMANCE, QUALITY AND  
COSTS. WRITE FOR COMPLETE  
SPECIFICATIONS.**



**KING-SEELEY  
CORPORATION**  
ANN ARBOR, MICHIGAN



# MPM

(including finish)

MONTHLY TRADE PUBLICATION

Established January 1944

Published by

DANA CHASE PUBLICATIONS

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*February • 1957*

**VOL. 14 • NO. 2**

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## METAL PRODUCTS MANUFACTURING

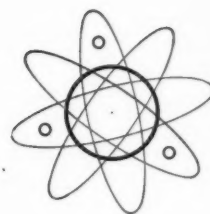
FROM RAW METAL TO FINISHED PRODUCT

A trade publication devoted to the interests of the metal products manufacturing industry with special editorial attention to home appliances. The editorial scope covers design, engineering, market and statistical information and technical and practical information on plant facilities and all phases of manufacturing "from raw metal to finished product." Free controlled circulation to top management, purchasing, engineering and key plant management and supervision in metal product manufacturing plants. To others, subscription price is \$8.00 per year, domestic. To all other countries \$10.00 per year (U.S. funds). Single copies, \$1.00.

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at Aurora, Illinois  
authorized January 7, 1948.



**when the time comes...**



for new and better glass products — whether it be today or 2000 A.D. — Marsco's craftsmen engineering team will develop them.

The Junior Spaceman above has the best in interplanetary protection — a glass space helmet — because glass can be bowed to fit any desired shape and yet it can be tempered to impart extreme resistance to impact.

You or your family don't need space helmets today but chances are glass could improve the utility and beauty of your product and make it more salable today.

Let Marsco's craftsmen engineering team impart to your product all the advantages of glass.

ask for the man from



**MARSCO MFG. CO., 2909 S. HALSTED ST., CHICAGO 8, ILL.**

*Here are some of the applications for Marsco heat-treated, tempered and hardened glass parts:*

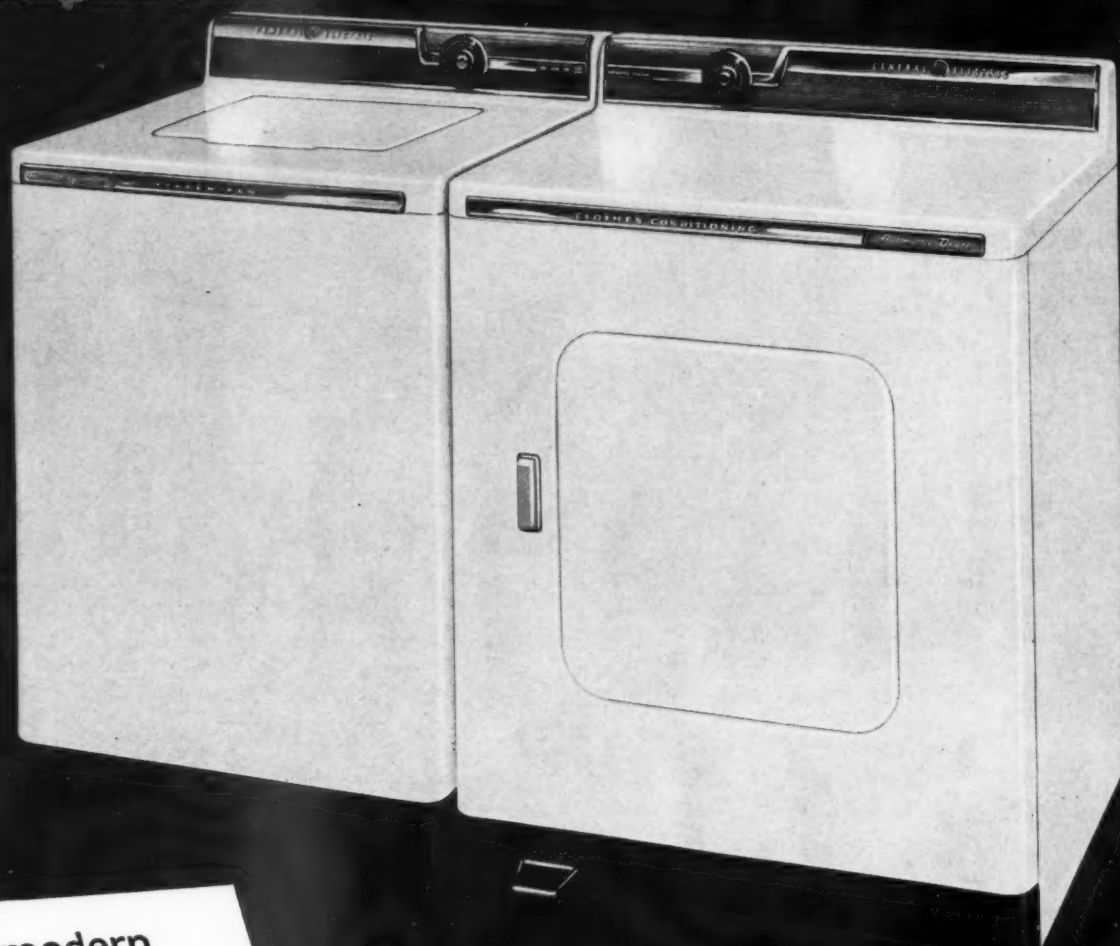
- |                          |                        |
|--------------------------|------------------------|
| • CLOCK & TIMER CRYSTALS | • LIGHT LENSES         |
| • OVEN DOORS             | • DIALS & NAME PLATES  |
| • RADAR EQUIPMENT        | • TELEVISION EQUIPMENT |
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*Special shapes for Instruments, Gauges, Household and Industrial Appliances.*

*Progress Is Our Most Important Product*

**GENERAL  ELECTRIC**

New G-E Washer and Dryer give you  
cleaner, brighter clothes—no lint fuzz



On modern  
washers and dryers

## **DULUX<sup>®</sup> Enamel finishes first in sales appeal...resistance to marring**



### **"DULUX" ENAMEL**

Better Things for Better Living . . . through Chemistry

**America's leading  
home-appliance finish**

Over 53,000,000 major home-appliance units now  
in service are finished with Du Pont DULUX Enamel.

AN APPLIANCE FINISH that dependably resists harmful effects of soaps, detergents and heat naturally gives modern washers and dryers added sales appeal. And that's only *one* of the sales-winning properties of durable Du Pont DULUX Enamel.

Constant research by Du Pont chemists has resulted in a finish that ruggedly resists chipping, cracking, scratching and staining. Application costs are lower with DULUX without sacrifice of quality appearance or performance.

DULUX keeps its first-day new look even after years of use in the home. Its longer-lasting whiteness, resistance to wear and easy cleanability help insure the continued customer satisfaction that's so important to the success of any appliance line. No wonder so many of today's topflight appliance manufacturers use Du Pont DULUX Finishes.

**E. I. du Pont de Nemours & Co. (Inc.), Finishes Div., Wilmington 98, Del.**



IN FLATWARE, TOO,

*Sharonsteel Quality*

STANDS OUT

A thorough knowledge of flatware manufacture —  
uncompromising adherence to analysis specifications  
— plus, the industry's finest finishes are reasons  
why so many of the nation's leading stainlessware  
makers demand Sharon Quality Stainless Steels.

**SHARONSTEEL**

*For 56 Years  
a Quality Name  
in Steel*

SHARON STEEL CORPORATION, SHARON, PENNA.

# THE finish



# LINE

We have received many comments on the evolution of our cover over a period of years. Early readers have had an opportunity to observe the evolution in both the cover and editorial content. For the benefit of all readers, this editorial briefly details this evolution, which resulted in the new title and cover appearing for the first time on this issue.

## THE 14TH YEAR OF EDITORIAL SERVICE

—to the Appliance and Metal Products Manufacturing Field began with our January 1957 issue.

Following the first issue in January of 1944, this publication has continued to broaden its editorial service to the Metal Products Manufacturing field, and paralleling this has continued a gradual evolution of cover design to more adequately cover the editorial content.

### From raw metal to finished product

Eight years ago, in January 1949, we made a break from the conventional in industrial trade magazines and announced a Complete Editorial Service for the Appliance and Metal Products Manufacturer—"From Raw Metal to Finished Product." Due to the gradual evolution of editorial content, as the publication grew in size, subject material was added without sacrificing space devoted to the important processes originally covered.

Our publication was the first to offer this important segment of American industry an editorial service on all important aspects of fabricated metal products manufacturing from the time the raw metal enters the plant to and including the safe delivery of the finished product.

### Unique circulation plan

Another point at which we have deviated from the conventional is in circulation policy. Within the appliance plants, for instance, individual copies go to top management, purchasing, engineering, works managers and key plant supervision. In addition, copies go to a broad group of fabricated metal products manufacturers ranging from commercial refrigeration and air-conditioning to sanitary ware, and from business machines to coin-operated vending machines (complete breadth of coverage requires study of a detailed circulation audit report).

In this connection, we are *not* attempting to be "all things to all people." What we are earnestly trying to do is to give the Appliance and Metal Products Manufacturing field a single source for the most important technical and practical plant operating information, an engineering breakdown of specific products, statistical information, a complete news service covering the industry's major associations, and plant and personnel information on individual manufacturing units. Hundreds of letters from readers indicate that we have achieved a reasonable measure of success in this effort.

### Note:

This editorial includes selected information from earlier *finish* Line editorials, appearing in January and September 1953, describing editorial and circulation policies. It covers the natural evolution and development of a broadened editorial service and introduces the new title METAL PRODUCTS MANUFACTURING which appears for the first time in this issue.

## The "man on the firing line" writes MPM

It has been the belief of our editors that despite many years experience in the industry served, we cannot possibly provide for our readers the best in technical and practical information in so-called "staff written" articles. That is why such a high percentage of feature editorial material on subjects pertaining to design, engineering and plant operations are written and by-lined by those who know the most about the subject covered—key management, engineering and plant men.

To back up our "field" and "on-the-production line" information, we have rounded out an organization of associate editors and technical consultants, each of whom is recognized as an outstanding leader in his respective field. Whether the problem pertains to fabrication, metal preparation, finishing, designing, engineering, assembly, packaging or quality control, MPM editors have the benefit of consultation with the top men in the industry for the planning of editorial material on these subjects.

While this publication has just closed a top year in quantity and quality of editorial content and its biggest year in income from advertising, we shall never measure the success of our editorial efforts in number of pages or income dollars. We prefer to measure in terms of value and service to our readers—points which can best be weighed from the personal and written comments to our editors.

### What's in a name

Whether it's POST, TIME, LIFE, FORTUNE, or FINISH, the title of a magazine means little in itself, but for the regular reader it comes to mean a definite type of reader service. As a result of the gradual evolution of this service, we have received repeated suggestions from readers, from advertisers, and from advertising agencies that we develop a name more nearly descriptive of our comprehensive editorial service. In line with these suggestions, we introduce for the first time on and in this February 1957 issue — METAL PRODUCTS MANUFACTURING.

All of our loyal readers have the assurance that only the name has been changed. Our editorial policy will remain exactly the same as that established in January of 1949. Our editors do expect, however, through the suggestions and comments of readers, to continue to add to the value of editorial services under the new name MPM.

*Dana Chase*

EDITOR AND PUBLISHER

(Finish advertisers will recognize the MPM name from our METAL PRODUCTS MANUFACTURING News Bulletin which has been published monthly, by our customer service department, since 1951.)



APOLLO Pre-Finished Metals arrive at your plant pre-polished, pre-plated or pre-enameled to your specifications—ready for forming. Once the forming operations are completed, the APOLLO Pre-Finished product is ready for packing and shipping. Time-consuming shop operations have been eliminated . . . increased functional beauty and production economies have been achieved.

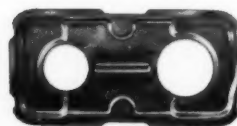
APOLLO Pre-Finished Metals can easily be worked by standard sheet metal and machine shop cutting and forming methods. They are uniform in quality, easy to weld, scratch-free, rust and tarnish resistant.

In addition, APOLLO offers special design services to assist you in getting the maximum advantages from Pre-Finished Metals. Professional sketches, economically adapting APOLLO improvements to your current or planned products, are available without obligation. You'll be surprised at the variety of decorative effects and practical advantages that can be obtained through a little advance planning.

**Pre-Finished Metals can lower your production costs, step-up production and help sell your products. Ask APOLLO for full details.**

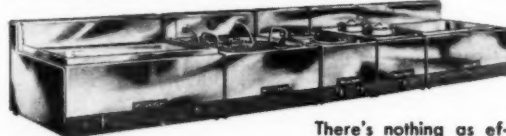
**These typical examples show how APOLLO Pre-Finished Metals help to sell at greater profit per unit**

Attractive hardware items in unlimited variety are being manufactured more economically and faster from APOLLO Pre-Finished Brass and Bronze. Available pre-polished and pre-enameled, or pre-finished with bright or satin chrome, the uniform beauty of these parts cannot be equalled by costly piece finishing.



Aerator pans, oven and rotisserie linings, back rail trim, stove doors and tops and broiler pans are customer appealing, sales creating features when made from APOLLO

satin or bright finished tarnish-resistant ChromSteel.



There's nothing as effective as the gleaming appearance of APOLLO Pre-Finished ChromSteel to sell certain types of food service equipment. Sturdy, tarnish-resistant, easy to work, weldable, APOLLO ChromSteel permits a finer job at a fraction of the cost of piece finishing, while greatly increasing production.



APOLLO Satin-Finished BrasSteel is ideal for radio, Hi-Fi and TV cabinet trim, control panels and hardware. Pre-finished surface allows

embossing, patterning and silk-screening operations to be performed before forming...cuts costs...saves time.

Manufacturers of decorator items like the way APOLLO Pre-Finished Brass and CopperSteel cut finishing and plating costs. Their products are more distinctive and attractive, too—possessing the gleaming appeal that makes them "best-sellers."



# Apollo METAL WORKS

6684 S. OAK PARK AVE.  
CHICAGO 38, ILLINOIS

## MEETINGS

### NESA CONVENTION

Eleventh Annual National Electric Sign Assn. Convention and Sign Equipment Exhibit, Sheraton Park Hotel, Washington, D. C., February 17-20, 1957.

### EASTERN ENAMELERS MEET

Eastern Enamelers Club Meeting, Statler hotel, New York City, February 9. Prominent speakers will be featured.

### SPI DIVISION CONFERENCE

Twelfth Reinforced Plastics Division Conference of The Society of the Plastics Industry, Inc., Edgewater Beach hotel, Chicago, Ill., Feb. 5-7.

### ASHACE ANNUAL MEETING

American Society of Heating and Air Conditioning Engineers, Inc., Annual Meeting and Exposition, Chicago, Ill., February 25-March 1.

### IHAC EXPOSITION

International Heating and Air Conditioning Exposition, International Amphitheatre, Chicago, Ill., February 25-March 1.

### PMI NATIONAL MEETING

Annual spring technical meeting of Pressed Metal Institute, Hotel Carter, Cleveland, Ohio, March 6-8, 1957.

### NACE MEETING

National Assn. of Corrosion Engineers Meeting, Kiel Auditorium, St. Louis, Mo., Mar. 11-15.

### TENTH METAL EXPOSITION

Tenth Western Metal Exposition and Congress, American Society for Metals and Technical Groups, Pan-Pacific Auditorium and Ambassador hotel, Los Angeles, Calif., March 25-29, 1957.

### GAMA ANNUAL MEETING

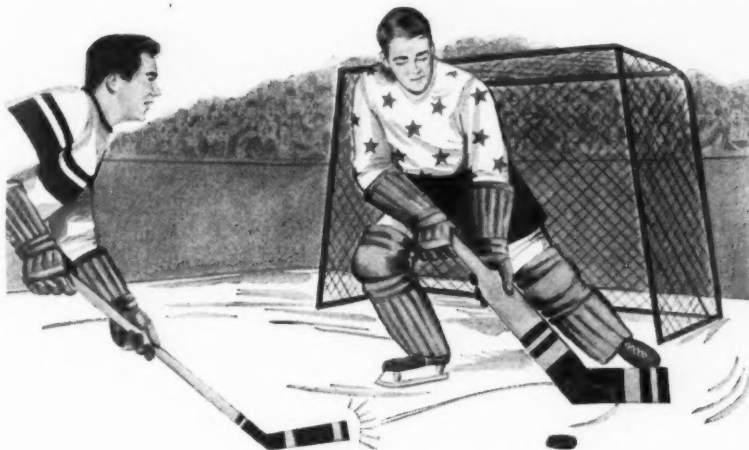
The Gas Appliance Mfrs. Assn., annual meeting, The Greenbrier, White Sulphur Springs, West Virginia, April 8-10.

### AHLMA ANNUAL MEET

American Home Laundry Manufacturers' Assn. Annual Meeting, French Lick Springs hotel, French Lick, Ind., April 14-17.

MPM FEBRUARY • 1957

## ...for Sure DEPENDABILITY



It Pays To

## RELY on GI

Fractional H. P. Motors

1/40 H. P. to 1/1100 H. P.

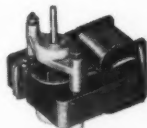
For sure, dependable power when it's needed most, General Industries fractional hp. motors are unbeatable! First choice of leading original equipment manufacturers, GI 1/40 HP to 1/1100 HP motors are your best bet for every standard application. For specific applications, as a free service, our design engineers will work with you to help solve your fractional hp. problem. For any fractional hp. requirement, you'll always be right when you...specify GI!

Write for complete specifications and quantity-price quotations today!



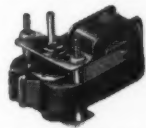
MODEL B

4-pole, 4-coil shaded pole AC Induction Type



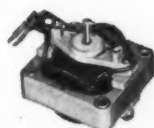
MODEL A

2-pole, shaded pole AC Induction Type



MODEL C

2-pole, shaded pole AC Induction Type



MODEL E

4-pole, shaded pole AC Induction Type



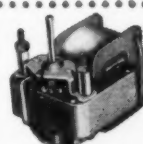
MODEL D

4-pole, 4-coil shaded pole AC Induction Type



MODEL O

2-pole Capacitor Reversible Type AC only (for 6, 12, or 24 volts)



MODEL F

2-pole, shaded pole AC Induction Type



THE GENERAL INDUSTRIES CO.

DEPARTMENT GF • ELYRIA, OHIO

# REPUBLIC STEEL SHEETS PROVIDE CUSTOM PROTECTION



## REPUBLIC



*World's Widest Range of Standard Steels*

# FOR STANDARD PRODUCTS

Large or small, production item or custom unit—every fabricated sheet metal product presents its share of manufacturing and application problems.

A good case in point is the soft-drink dispenser and cooler, shown being assembled at left. Made by the Ideal Dispenser Company, Columbus, Ohio, these units are in use throughout the world under all climatic conditions.

Republic Continuous Galvanized, used for the liner box, is subject to shearing, blanking, piercing, forming, flanging, soldering, beading, and Pittsburgh Lock Seaming. In spite of this punishment, its tight zinc coating remains undamaged. Ductility assures easy workability, yet the steel is rigid enough to withstand severe use.

Republic Electro Paintlok®, used for the exterior housing, provides an excellent paint-adhering surface

even after stamping and forming. "Hot room" tests have proved it the best base material under temperature and humidity variations found in any part of the world at any time of year.

Republic ENDURO® Stainless Steel, used for hinged covers on lift-top dispensers, provides a handsome appearance and is easily kept clean and sanitary for the life of the cooler.

Each of these Republic Steel Sheet Products provides the exact characteristics required to withstand the service expected of the part it forms. The combination provides custom protection for the completed product.

It will pay you to get full information on how Republic's versatile line of sheet products can help solve your production and application problems. Simply contact your Republic Steel Distributor. Or mail coupon, today.



**REPUBLIC ELECTRO PAINTLOK** retains its excellent paint-gripping surface characteristics after severe forming operations. Produced by electro-galvanizing and a chemical treatment process, Electro Paintlok Sheets are shipped from the mill in prime condition for painting. Even if final finish is scratched through, this coating limits corrosion to the point of damage.



**REPUBLIC CONTINUOUS GALVANIZED** steel sheet is subject to extreme forming processes during fabrication into the cooler liner box. Its tight, uniform zinc coating will not crack, flake, or peel under any operation permitted by the base metal. Excellent ductility allows easy workability, yet sheet is sufficiently rigid to withstand rugged service.

**REPUBLIC ENDURO STAINLESS STEEL** provides bright, long-lasting beauty with minimum maintenance. Forming and working qualities of ENDURO permit fabrication on existing equipment. Exceptional strength and toughness plus high heat- and abrasion-resistance keep products looking newer longer. Send coupon for information on Republic ENDURO Stainless Steel and other sheet products.

# STEEL

*and Steel Products*

## REPUBLIC STEEL CORPORATION

Dept. C-2988

3204 East 45th Street  
Cleveland 27, Ohio

Please send me further information on:

- ☐ Continuous Galvanized Sheets
- ☐ Electro Paintlok Sheets
- ☐ ENDURO Stainless Steel Sheets

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

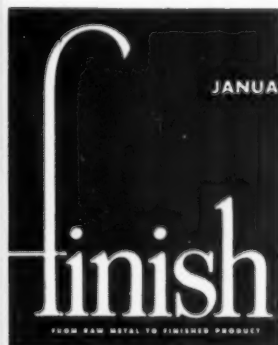
# Metal Products Manufacturing

---a name that clearly reflects comprehensive coverage of appliance and metal products manufacturing, evolved throughout 13-plus years---

**Milestones in the evolution of full editorial coverage of appliance and metal products manufacturing:**



With its establishment in January 1944, finish took the first step toward full editorial treatment of appliance and metal products manufacturing. Featured in this first issue were an article on the Caloric Gas Stove Works plant (now Caloric Appliance Corporation); an article by Mary Davis Gillies, interior decorating editor (now house and home fashion editor) of McCall's Magazine on women's preferences for white vs. colored kitchens; and a writeup of a wartime conference of the stove industry (now Institute of Appliance Manufacturers) — meetings covered twice a year since. These and other editorial features foreshadowed later emphasis on all phases of metal products manufacturing.



In January 1949 finish made a break from the conventional in industrial trade magazines and announced a Complete Editorial Service for the Appliance and Metal Products Manufacturer — "From Raw Metal to Finished Product." Due to the gradual change in editorial scope as the publication grew in size, subject material was added without sacrificing space devoted to its early interest in specific production processes.

**1950 - 1951 - 1952**



The importance of emphasizing to readers and advertisers that the editorial scope of finish covers all phases of appliance and metal products manufacturing has in the past dictated changes in the format of its distinctive cover. Editorial policy, scope and content have remained unchanged since 1949 — only the appearance of the magazine itself has been altered.



**Metal Products Manufacturing** has been selected as our new name because it so completely describes the editorial scope and content of the magazine since 1949.

The staff, technical consultants and contributors who have made the publication the leader in coverage of appliance and metal products manufacturing will continue to provide complete information for readers. This coverage includes design, engineering, market and statistical information, technical and practical information on plant facilities and manufacturing operations - - - plus complete industry news.

**REMEMBER - - -** the name has been changed; the cover design has necessarily been changed; but inside is the invaluable information on all phases of metal products manufacturing that has made finish "must" reading for thousands of qualified key management, operating, design and production people for over 13 years.

This was the last issue to use the finish cover. Note the evolution in cover design since 1949 with the resulting predominance of the words "The Magazine of Appliance and Metal Products Manufacturing," testifying to the direction of editorial emphasis. Henceforward, METAL PRODUCTS MANUFACTURING will continue to bring to its readers the same top-quality editorial information on processes "from raw metal to finished product" that has built reader confidence and loyalty during a period of over 13 years.



# Metal Products Manufacturing DELIVERS THE MOST COMPREHENSIVE EDITORIAL COVERAGE OF APPLIANCE AND METAL PRODUCTS MANUFACTURING — WITH FEATURES WRITTEN BY THE TOP PEOPLE IN THE FIELD

The following are examples of typical features and typical authors, taken from 1956 issues of *The Magazine of Appliance and Metal Products Manufacturing*.

## MANAGEMENT

**COLOR . . . the vital impact in today's sales**  
by Howard Ketcham, Howard Ketcham, Inc., Color Stylists

**Our Management Philosophy**  
by W. L. Rheem, II, Vice President and General Manager  
Rheem Manufacturing Company

**The outlook in the gas appliance field**  
by Edward R. Martin, Director of Marketing and Statistics, GAMA

**The outlook for electrical appliances**  
by J. W. Miller, Managing Director, and  
A. J. Nesti, Chief Statistician, NEMA

**Home appliance built-ins**  
by Margaret Stedman

**Third Annual Statistical Review and Forecast\***  
The world can be your market  
by Richard F. Morris, Sales Manager International Division,  
Whirlpool-Seeger Corp.

## ENGINEERING & DESIGN

**Organization for engineering and manufacturing**  
by L. W. Evans, Vice President, Rheem Manufacturing Company

**Engineering the Mitchell**  
by Frank Scire, Director of Engineering, Mitchell Mfg. Company

**Engineering the Maytag automatics\***  
The potential of printed circuitry in major appliances  
by C. F. Kent, Sales Manager  
Printed Circuit Division, Croname, Inc.

**What is air conditioning horsepower?**  
by Paul W. Wyckoff, Chief Engineer  
Airtemp Division, Chrysler Corporation

**Planned obsolescence**  
by Brooks Stevens, Fellow, Society of Industrial Designers

**That new electronic surface control unit**  
by Calvin J. Holtkamp, Electric Appliance Division,  
Westinghouse Electric Corp.

## FABRICATION

**Short run specialists in metal stamping**  
by V. W. Danielson, President, V. W. Danielson Manufacturing Co.

**Slitting and shearing . . . steel — and costs\***  
Scrap steel inserts for power brake dies\*

**How versatile is your punch press operation?**  
by Gilbert C. Close, Western Editor

**Processing 200 tons of metal daily**  
by Robert State, Superintendent — Sheet Metal, The Maytag Co.

**Formability of metals**  
by Lester F. Spencer, Consultant in Metallurgy (series of 4 articles)

**Roller vacuum lifter rotates sheet 180°\***  
Fabricating water heater tanks  
by Gilbert C. Close, Western Editor

## METAL PREPARATION

**That new cleaning facility at Fresh'nd-aire plant\***  
They blast clean 220 tanks per hour in automatic operation\*  
(Maytag)

**Practical innovations high-light West Coast metal treating system\***  
(Douglas)

**Utility Appliance's expanded operation — lesson in modernization\***  
Many other processing descriptions in complete plant articles

## FINISHING

**A method for recovery of zinc plating solutions\***  
Clay free porcelain enamels  
by A. L. Friedberg, Research Associate Professor, Department  
of Ceramic Engineering, University of Illinois

**You can use reflective beads with porcelain enamel**  
by D. C. Bowman, Senior Ceramic Engineer, Chicago Vitreous Corp.

**Develop abrasive jet method for evaluating organic coatings\***  
Electrostatic spraying porcelain enamel at General Electric  
by W. L. Smart, Project Engineer, Ransburg Electro-Coating Corp.

**How conveyors and equipment can minimize paint finishing costs\***  
How you can brighten stainless steel parts by electropolishing  
by W. E. McFee, Supervisor Production Information Service,  
Armco Steel Corporation

**Porcelain enameling aluminum at Cameo**  
by Gilbert C. Close, Western Editor

**Painting a Rainbow at Maytag**  
by John Wert, Superintendent — Paint Finishing, Plant 2

**"Hot Spraying" at Pittsburgh Reflector**  
by Robert C. Zinsmeister, Plant Manager

## PLANT FEATURES & PRODUCT ASSEMBLY

**Caloric streamlines its material flow pattern\***  
Producing a combination washer-dryer unit at Westinghouse\*

**Ultra-modern production lines for steel drums\***  
Manufacturing steel cabinets at Olympia  
by Howard E. Jackson

**"Comfort is our Business"\***  
A Report on the Mitchell Manufacturing Company

**The Maytag Story\***  
A Special Report  
Assembling the "Perk-O-Fresh" coffee vander\*

**It's a smooth flowing operation**  
by Frank Hayler, Superintendent—Assembly, Plant 2, The Maytag Co.

**Cory's all new commercial automatic coffee brewer**  
by Harvey Karlen, Chief of product research & development,  
Cory Corporation

## SAFE TRANSIT

**Pre-testing results in \$234,000 annual savings for O. A. Sutton\***  
Packaging Fresh'nd-aire's\*

**Combating the seasonal trend in shipping damage**  
by Ralph F. Bisbee, Manager of Quality Control, Westinghouse  
Electric Corp.

**Packaging Mitchell air conditioners**  
by Stanley P. Rhein, Production Manager, Mitchell Mfg. Co.

**Assuring safe transit at Mt. Vernon Furnace\***  
Industry packaging exposition at St. Louis

**Safe arrival is important to Revere Electric**  
NST certifications reach new high  
(over 250 leading manufacturers)

## ASSOCIATION NEWS

**Major electric appliance goal set for '57 at NEMA annual meeting\***  
Industry competition keynote of GAMA meeting\*

**Institute of Appliance Manufacturers year-end conference\***  
9th Air Conditioning and Refrigeration exposition\*

**Winter Market is big success\***  
AHLMA 40th Anniversary meeting\*

**PMI's spring technical session\***  
(22 association meetings covered annually).

\*Staff written.

Following the same editorial policy within the same scope, METAL PRODUCTS MANUFACTURING will remain, in 1957 and beyond, a top value to its readers.

# Metal Products Manufacturing






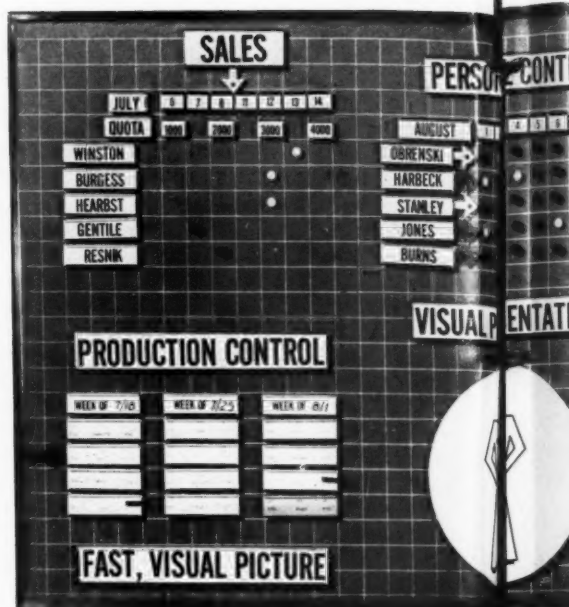
## CANCER LIFE-LINE

In factories, plants and offices across the nation, the line is busy. Through films, pamphlets, posters, exhibits and lectures, the life-line of cancer education is reaching more and more men and women in business and industry.

All of us are concerned with the major threat which cancer poses. Today, thousands of lives are being saved each year, but many more would be saved if people went to their doctors *in time*. This, and many other facts of life about cancer, are part of the education program which the American Cancer Society offers you in your plant or factory. For additional information, call the American Cancer Society office nearest you, or write to "Cancer" in care of your local Post Office.

 AMERICAN CANCER SOCIETY

## Interesting Industry Developments



### Home-grown ingenuity shakes out production bottleneck

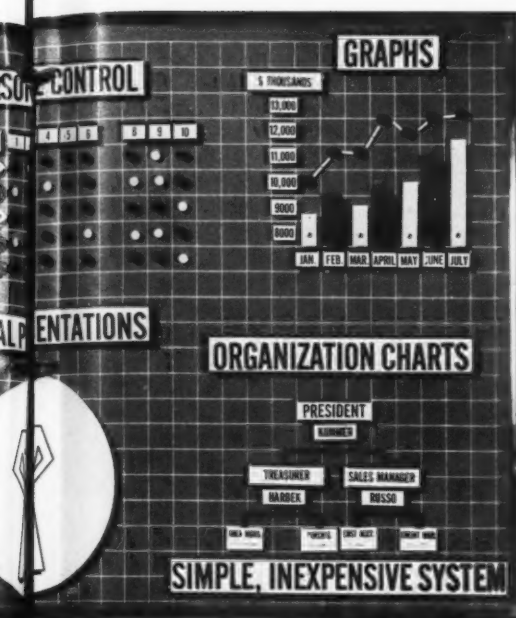
IN this day of automation and electronic brains the solution to a tough production problem is frequently thought of in terms of costly specialized equipment. Charley Bartz, Plant Superintendent of R. Krasberg & Sons Mfg. Co., Chicago, recently proved that a little gadgeteering can sometimes do a better job.

It is extremely important to Krasberg & Sons, who manufacture precision stampings, that their finished stampings be delivered free of slugs and chips.

The sorting and cleaning of stampings was a time-consuming hand job until Charley got his brain storm.

Instead of handling each piece, Charley decided to build a vibrating screen that would shake the slugs from hundreds of stampings in one operation. Using several feet of Dexion Slotted Angle, a handful of bolts, and an air vibrator, he had a table built in his own shop at a cost of less than \$125 for materials, much less than the price of a ready-made vibrating screen.





## New magnetized control board for visual control systems

**V**ISUAL control of business operations, with changeable records that are out in the open for all to see and be guided by, is being used today by thousands of plants in scores of industries. It has been thoroughly demonstrated that visual control promotes efficiency.

A new magnetic Board adds several advantages to visual control. It provides visual records that are more impressive and dramatic. It is so much more flexible that it can be applied to any problem. Providing the easiest and quickest method of changing the visual record, the board consists of a magnetic steel board which holds firmly on its surface the visual elements that comprise the needs of the user. The visual elements are: — permanent magnets of various

colors and sizes; magnetic card holders for typed, printed or written information; plus larger supporting units for pictorial presentation. Acetate tapes for maps, charts, graphs are available. Colored plastic bars for charts, and graphs, circular identification stickers, and magnetic arrows, straight and curved, can also be obtained, and are guaranteed for a lifetime of operation.

The board can be used with eminent success for production schedules, sales records and quotas, management control and analysis, graphs and charts, service schedules, inventory control, personnel records, traffic control, warehouse records, organization charts, in and out registers, and a host of other business purposes.

Free-shaking action is achieved by mounting the screen frame on eight coil springs. The screen itself fits loosely in the framework and is easily lifted out so that different sized screening may be substituted for varying sized slugs and stampings. The table, which is 40" x 40"

x 36" overall, has a hopper bottom that dumps the slugs directly into a scrap box.

Every stamping produced by Krasberg & Sons is now cleaned without special handling. Charley estimates that this homemade gadget saves 60 man

hours a week, and plant output is no longer limited to the speed of the cleaning gang.

If you would like more information on how the table was built, including construction drawings, drop a line to Special Projects Editor.

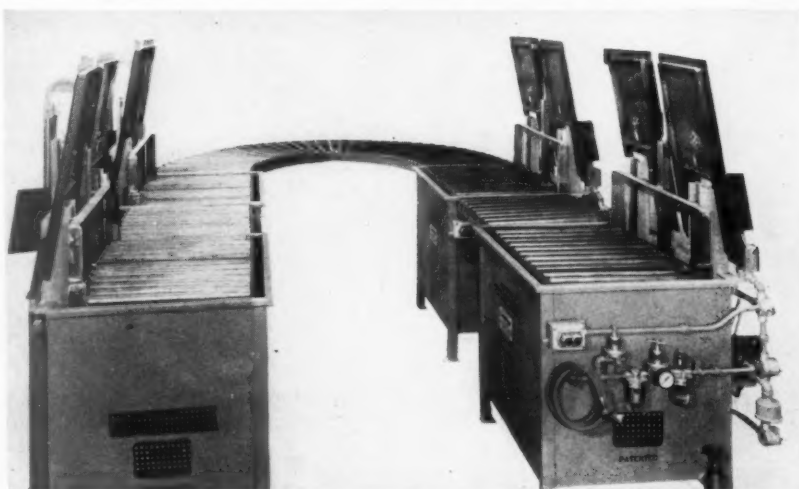
## Automate metal cleaning operation with new machine design

**A** NEW patented automatic conveyorized machine which gives complete automation for metal cleaning and dipping operations has been announced that offers a tremendous saving in time and manpower and does a much faster, better and safer cleaning job than any previous methods.

The new machines are designed for metal cleaning with petroleum solvents, alkalis, emulsion cleaners and other types of commercial metal cleaning and paint stripping solutions. They are also designed for rinsing, rustproofing and various preparatory and coating operations. The automatic conveyorized machines are of heavy construction and are furnished in various sizes to handle all cleaning and dipping operations. Small parts are cleaned in baskets, which are conveyed from one tank to another, and large parts, such as heavy castings and motor blocks, are individually cleaned and conveyed through the various cleaning and rinsing stages.

Parts are loaded flush with top of machine, at a normal working height of 36", eliminating heavy lifting and the necessity of operator's hands being in harsh chemicals.

Operation is simple. By pressing but-



ton, loaded rack automatically lowers to bottom of machine and the agitation begins. After desired agitation cycle, by pressing second button, agitation stops and loaded rack rises flush with top of machine for next operation. Agitation is automatic, not requiring the services of an operator except to load and unload.

Where complete automation is required, machines can be furnished with solenoid relays and cam operated timers to automatically load, unload, and convey baskets or parts from one operation to the next.

When required, the machines can be equipped for soak cleaning in conjunction with the agitating feature.

**IN EVERY WAY...**  
**Follansbee Means Quality**

**FINEST FINISH**

**GAUGE & WIDTH UNIFORMITY**

**ADHERENCE TO SPECIFICATIONS**

**SUPERIOR SERVICE**

**COLD ROLLED STRIP**

**by  
FOLLANSBEE**

Follansbee cold rolled strip is made to your exact specifications, has true gauge and width uniformity and the finest finish in the industry.

Follansbee's reputation for the finest cold rolled strip is a result of rigid quality control through every phase of production.


You'll like the service your Follansbee representative gives you. Call him the next time you are ready to order cold rolled strip.

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**STEEL CORPORATION**



**FOLLANSBEE, WEST VIRGINIA**

**Cold Rolled Strip • Seamless Terne Roll Roofing • Polished Blue Sheets and Coils**  
*Sales Offices in Principal Cities*



**production-  
proved**

**for your  
protection**

*FERRO COLORS for Porcelain enamels, whether supplied as oxides or smelted into tinted frits, are skillfully developed for specific applications, then thoroughly tested under production conditions for your protection.*

Here at Ferro we bring *all* the science of Porcelain enameling to bear on your color problems. In working out color formulas we consider frit characteristics, firing temperatures, production conditions in your plant. This pays off for you in higher production and lower Porcelain enameling costs per unit.



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Slump Tester	Rotosprays and Parts
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Ferro Built Dryers	Continuous Furnace Tools
Asbestos Mitts	Spray Equipment: Safety Block and Tackle, Containers,
Asbestos Slip-on Patches	Transformers, Compressors, Fans, Tanks,
Stencil Brush	Turntables, Parts, Hose, Fittings, Reflectors, etc.
Adjustable Edging Brush	Muffles, Muffle Brick and Tile
Flat Cleaner Brush	Radiant "W" Tube Muffle Centre Wall
Bolt Hole Brush	Rubbing Stones, White Alundum, 60 Mesh, 80 Mesh
Beading Sponges	and 150 Mesh
"Ferro-Processed" Clays	Frits, Porcelain Enamel, Acid-Resisting and Non-Acid-
Electrophotometer Unit	Resisting: Ground Coats, Cover Coats, Black Edging
Color Oxides by Ferro	Furnaces—Batch, Continuous, Laboratory—All Fuels
Magnetic Separators	Complete Line of Laboratory Equipment
Plain Loop Racks	Boric Acid • Ammonium Carbonate • Zinc Oxide •
Hanging Racks	Borax • Bentonite, Purified • Gum Tragacanth •
Point Loop Racks	Sodium Nitrite • Magnesium Carbonate • Potassium
Straight Point Bars	Carbonate • Nephelite-Syenite • Single Nickel Salts
1" Triangle Bars	Compressed-air-operated Ejectopump
Burning Bars	Porcelain Lining Blocks and Balls
	Pickling Equipment
	Mills

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you don't have a copy of  
our latest price list write us,  
we'll mail you one promptly.



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# PREWAY

# another user of PERMA-VIEW WINDOWS



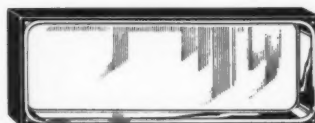
Preway, Inc. has been a satisfied user of PERMA-VIEW windows for a number of years. Now 55 other leading manufacturers are using "the window you can see through always."

The strong steel encased, double pane PERMA-VIEW window incorporates the finest quality heat resisting glass. It is mechanically sealed to prevent infiltration of vapors and to eliminate "fogging." This "No-Fog" window meets the constantly growing demand for "visible baking."

The PERMA-VIEW window is pre-engineered, and comes to you ready for immediate installation in your range — "out of our carton into your door." Let our specialized production lines serve as a part of your sub-assembly facilities. Phone or write us for complete details on the ease and economy of adding this sales feature to your new ranges.

## PREWAY

ONE OF THE  
**56 LEADING**  
RANGE MANUFACTURERS  
USING  
**PERMA-VIEW**



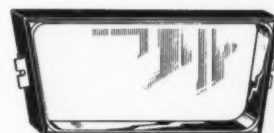
RECTANGULAR



SQUARE



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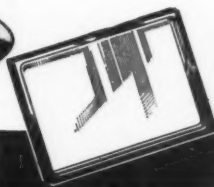
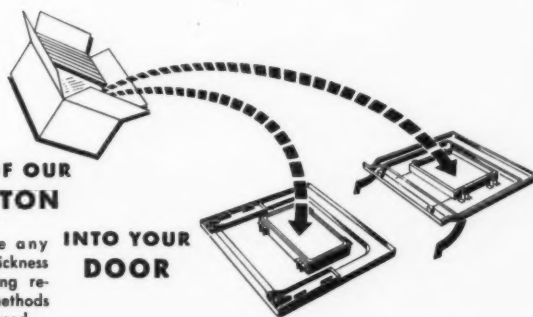


TRAPEZOID

OUT OF OUR  
CARTON

INTO YOUR  
DOOR

We can manufacture any shape, any size, any thickness to meet your engineering requirements. Alternate methods of attachment may be used.



# MILLS PRODUCTS INCORPORATED

1013 WEST MAPLE ROAD

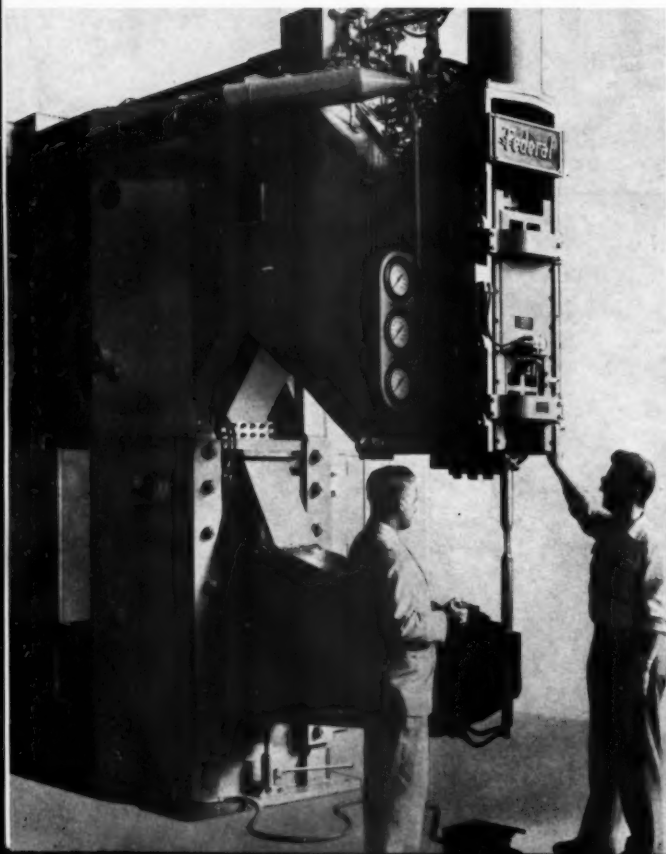
WALLED LAKE, MICHIGAN



**LOLA GETS WHAT LOLA WANTS** according to Sherry O'Neil, star of "Damn Yankees." Here, with Arnold VerLee, executive of Easy Laundry Appliances, Miss O'Neill explains that every girl wants an easy, uncrowded washday and the most compact washing-drying unit possible.



Automatic Custom dehumidifier by Coolerator.



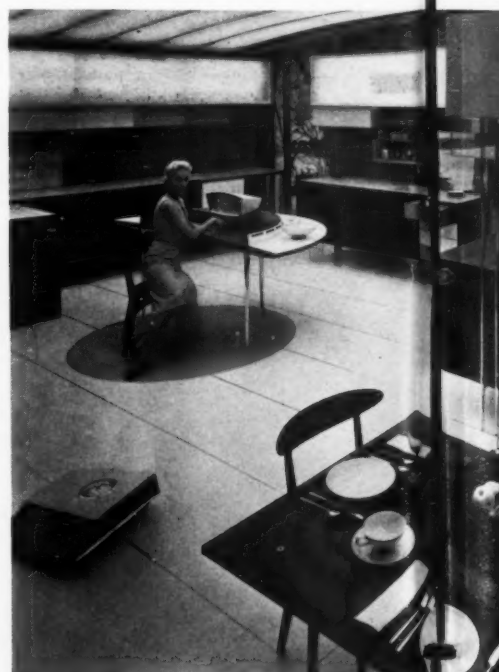
**THIS SPOT WELDER**, built by Federal Machine and Welder, is the largest resistance spot welding machine of this type ever built. It is designed with a special throat or work clearance area of approximately 2100 sq. in. to accommodate a portion of the tail section of the largest commercial jet airliner under construction.

## the MPM . . .

on the theory that one photo equals one picture will bring you many photos and equipment in the fabricated



**BUILT-IN OVENS** and refrigerators by Hotpoint were a part of an elaborate appliance display in the company's Merchandise Mart space at the Chicago Market. Here J. C. Sharp, Hotpoint president, and Mrs. Sharp inspect a built-in oven with built-in rotisserie and oven door window. Ovens were shown in three colors, coppertone, and brushed stainless steel.



**PRESS A BUTTON** or wave a hand, and, by predesignated control, a self-propelled servicing cart detaches itself from a dishwashing mechanism in the wall (far left) and moves to a dining table to deliver

## ... foto-news

thousand words this MPM foto-news features a few words about people, products and metal products field . . . .



**NORGE BIRTHDAY** is celebrated as Judson S. Sayre, president of Norge Division, Borg-Warner Corp., and Roy C. Ingersoll, B-W chairman, join hands in cutting a cake marking the Norge 30th anniversary. The picture was made during the Chicago Home Furnishing Market, Jan. 7, 1957, exactly 30 years from the day that Norge obtained its name.



complete table service or receive soiled dishes, returns to its nest in the wall, disposes of waste and does the dishes. This is only one of the many services available in the RCA-Whirlpool Miracle Kitchen.

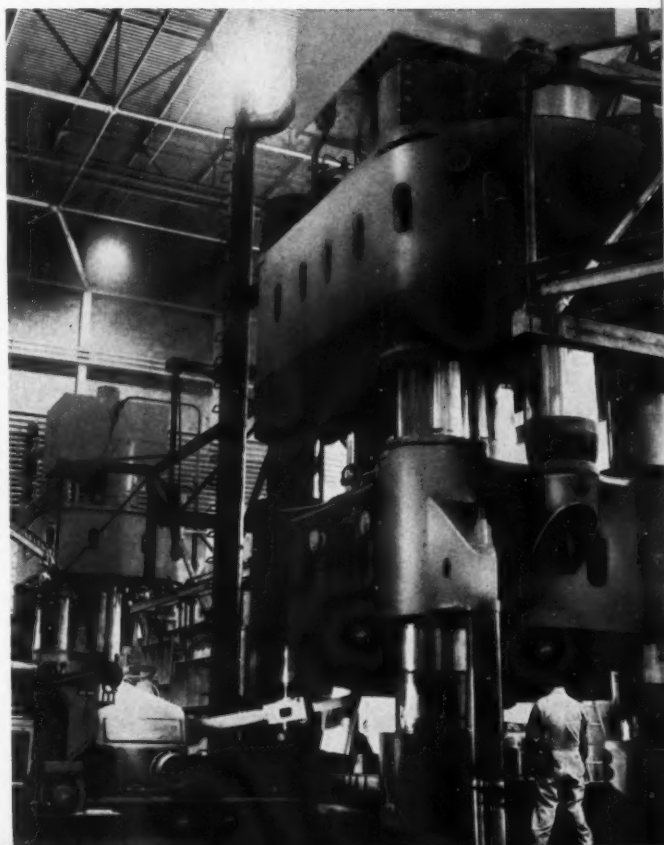


**CHRYSLER'S 1957 NEW YORKER** utilizes more than 100 pounds of aluminum, according to a recent survey by Aluminum Company of America. The young lady is holding an extruded quarter window frame of aluminum. The many aluminum parts are displayed in the foreground.



Dual hand dryer by American Dryer Corp.

**THIS FORGING PRESS**, now in production at the Torrance, Calif. works of Harvey Aluminum, is capable of exerting 8000 tons pressure for forging aluminum parts. Height of the 8000 ton capacity hydraulic press is 53 ft., with 35½ ft. above the floor level. In the background is a 4000 ton capacity unit for similar work.



# THE MPM *spotlight*



Each Revco Built-in has outside dimensions of 33" high x 33" wide x 23 $\frac{1}{4}$ " deep. Each has its own compressor and can be installed separately or in combination with many choices of arrangement and capacity. Models are offered in Stainless Steel, Antique Copper (plated) and Custom Colors to match the colors of kitchen cabinet manufacturers. Pictured here is a Model RC-87 Custom Refrigerator, above, and a Model RI-97 Ice Maker Refrigerator, below.

Now you can

# Flowcoat

'most anything with NEW

IC *Ultraflo*  
ENAMELS

That's right! With these revolutionary new products you can obtain a mirror-like finish free from sags, runs, or pinholes—even on a full-size refrigerator or other objects with large surface areas and long lines of flow.

IC Ultraflo enamels provide rapid and complete drainage, instantaneous bubble release, excellent "hang" around edges and holes, and require only a short time in the solvent chamber and a minimum of supplemental spray. For YOU, this means lower costs, faster production line speeds and fewer rejects.

For tough corrosion problems, get that added protection with IC Ultraflo corrosion-resistant primers. Call your nearest IC Finishes Specialist or write for new Ultraflo Bulletin FM.



## Interchemical CORPORATION Finishes Division

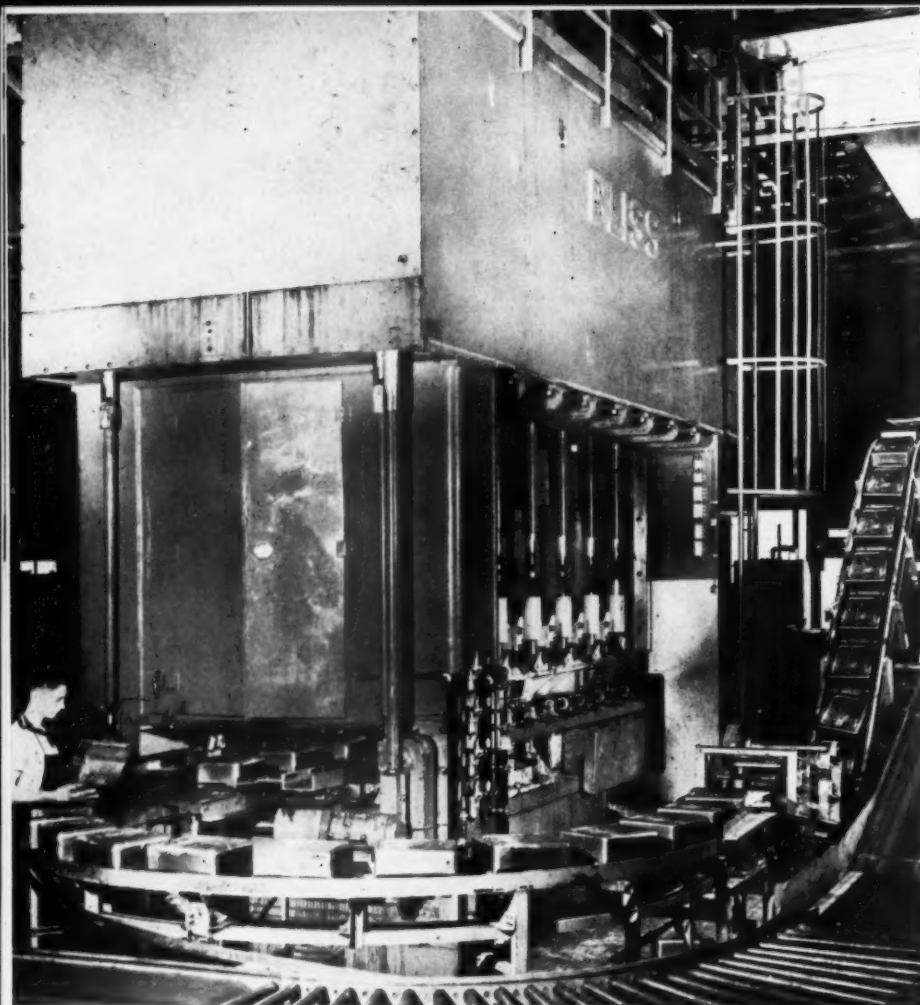
Headquarters Office: 224 McWhorter Street, Newark 5, N.J.  
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• Los Angeles, Cal. • Newark, N.J. • Mexico City, Mex.

In Canada, this product is made by Aulcraft Paints Limited, Toronto, Ontario, and sold under its trademark.

\*IC and Ultraflo are trademarks of Interchemical Corporation

Write today for your copy  
of New Ultraflo Bulletin FM





## G. E. press set-up

### is lesson in economy

**A**LL of the refrigerator pans and shelves General Electric needs for its annual output of more than a half million refrigerators are now being produced on three transfer feed presses installed at Appliance Park.

Production of these parts formerly required the services of two or three vendors, doubling or tripling the costs of dies and labor and creating difficult expediting problems. Perhaps most significant, however, is the fact that with the automatic coil handling equipment specifically designed for these presses, General Electric is able to produce its stampings direct from regular mill coils.

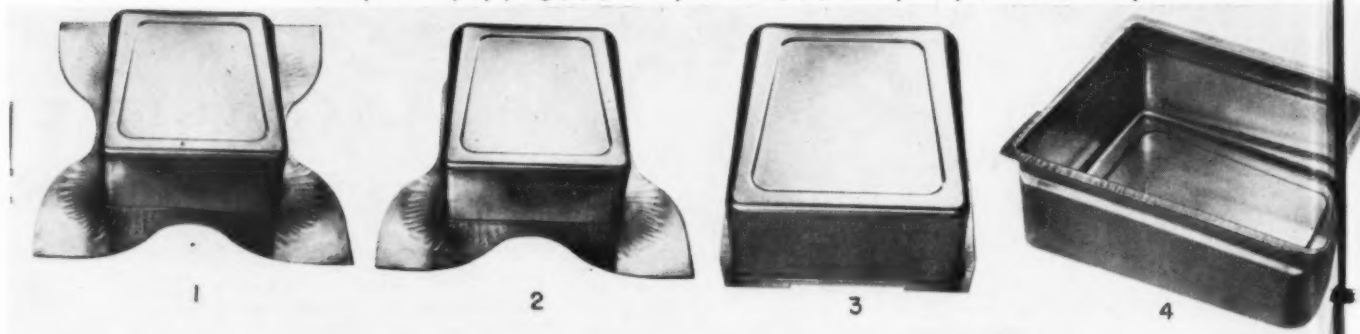
#### Three separate press lines involved

There are three separate press lines involved. One is a 700-ton, seven-station transfer feed press (with powerized coil cradle, straightener and roll feed) that produces 12 deep-drawn refrigerator pans per minute and feeds them off onto a conveyor automatically. The other two — identical to one another — are 800-ton, six-station transfer feed presses equipped with coil cradle, straightener and roll feed. These presses produce G-E's rotary and stationary refrigerator shelves at the rate of 15 per minute direct from standard mill coils.

The method of operation is common to all three. Standard mill coils, up to 6,000 lbs., 54" in diameter, and 22" in width are loaded onto the coil cradle (a second coil can be held in readiness on a power loader). The coil winds off the cradle at the desired rate, goes through a motor-driven five roll straightener and goes into the synchronized roll feed of the press. From

#### three transfer feed presses produce shelves and refrigerator pans at 15

*Sequence of operation in making refrigerator crisper pans: (1) cut off 22" by 24" blank and deep draw to size 11 $\frac{1}{4}$ "W, 13 $\frac{3}{8}$ "L, 5-13/32"D, (2) rough trim rear half of flange, (3) rough trim front half of flange, (4) cam form sides, (5) cam form front recess and pierce holes in*



there, the strip goes to the first station of the press where it is cut off.

Transfer feed fingers, driven by cam and gear linkage from the main shaft, move in on the work piece and carry it to the next station. As the press slide descends, the fingers move out; as it rises, they move in and repeat the cycle. The cycle is continuous, feeding new strip to the first station and delivering a completed part with each stroke of the press.

#### Sequence of operations

In making the refrigerator crisper pans, for example, here is the sequence of operations: (1) cut-off and draw, (2) rough trim rear half of flange, (3) rough trim front half of flange, (4) cam form sides of pan, (5) cam form front recess and pierce two holes in sides, (6) curl rear flange and form indentations in side flanges, (7) finish trim flanges.

The rotary shelf lines are quite similar. Here is the sequence: (1) cut off and draw, (2) form sides down, (3) pierce half the total number of slots, (4) pierce the remaining slots, (5) trim all around, (6) extrude the slots. After the rotary shelves leave the transfer feed press, however, there is this difference: instead of loading directly onto a conveyor, they are automatically fed into a 800-ton press for embossing.

Actually, if it weren't for the size and tonnage limitations made necessary by the building height, the embossing operation could have been built into the transfer feed press. As it is, however, the embossing press is located right at the feed-out end of the transfer feed

press and requires little extra space. Work leaving the embossing press (15 per minute) is loaded onto the conveyor line for final processing.

#### Equipped for seven stations

Each press has seven stations — although only six stations are used on the two 800-ton presses making shelves. The extra station was built in because future production of different models might require an extra station. The presses reflect the design flexibility in other ways: each die station is equipped with a "sub-slide" which makes it easy to change and adjust dies, and the feed fingers can be replaced to suit special work handling problems. In addition, the coil cradles are adjustable for various size strip, as are the straighteners.

While the principle of the transfer feed is not new, these presses represent the most recent advance in the design. Two channel bars extend the full length of each press, and the feed fingers are bolted to these bars. Two pairs of driving mechanisms, one on each end of the press and linked by yokes to the main shaft, control the movement of the channels. One pair directs their lateral movement (left to right), and the other pair directs the in-and-out movement of the bars. Since the drive is taken right from the ends of the shaft, there is no danger of the feed drive getting out of time with the press slide.

The design of the presses themselves represents a trend within the industry — the complete enclosure of working parts and controls. All air, electrical and lubrication controls are housed behind panels within the press uprights,

thus presenting a smooth, uncluttered exterior. Each press is essentially a straight side, single-action double crank press. The frame is four-piece welded steel construction, keyed for accurate alignment and held by pre-shrunk steel tie rods. Lubrication of the various wear surfaces is completely automatic, with two separate systems for the transfer feed yokes alone. Electrical interlocks in the lube lines will shut down the press if lubrication is not at proper pressure.

While the total installed cost of the five presses, automatic coil handling equipment and tooling was in excess of one million dollars, the direct and indirect savings made possible by them is expected to result in early amortization of General Electric's investment in this high production equipment installation for refrigerator parts.



*Standard mill coils are used. After threading operation, a single attendant is all that is needed for the operation.*

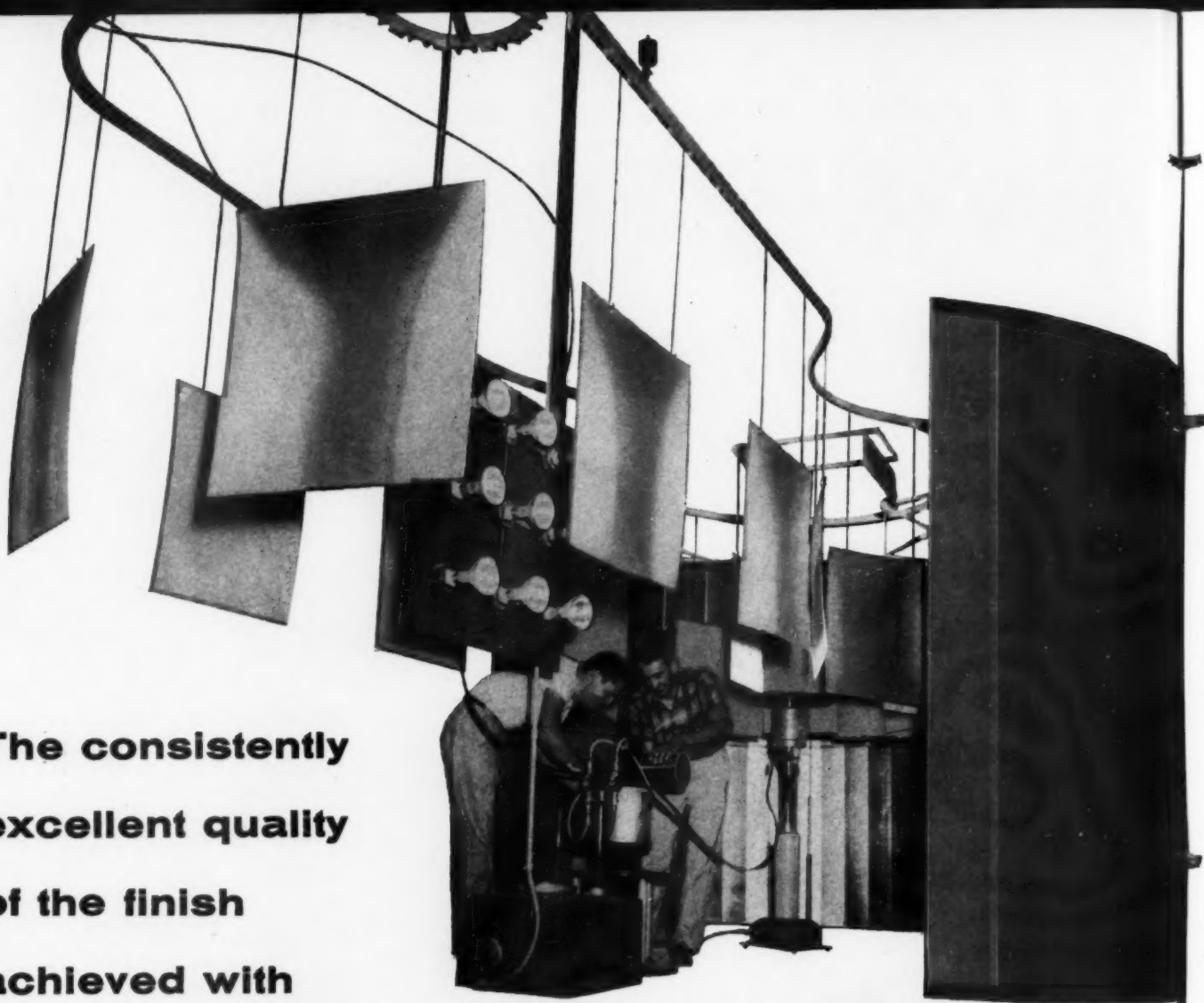
at 15 per minute rate, direct from standard mill coils, at Appliance Park

sides, (6) curl rear flange and form indentations in side flanges, (7) finish trim rear flanges. Scrap from these operations falls through the bolster and into a pick-up conveyor in pit below.

Photos: courtesy E. W. Bliss Co.



**The consistently  
excellent quality  
of the finish  
achieved with**



# *Pemco Covercoats* **starts here!**



*Manufacturers of "the World's Finest" Porcelain Enamel  
Frits, Glaze Frits, Coloring Oxides, Screening Pastes,  
Body and Glaze Stains, Underglaze and Overglaze  
Colors, Vitrifiable Glass Colors.*



**corporation**  
**BALTIMORE 24, MARYLAND**

This disc atomizing type electrostatic spraying system at Pemco assures customers who employ this method of spraying in production that frits supplied by Pemco will "behave" properly. In addition to helping customers speed production and cut costs, it will play an important part in the development of entirely new enamels for use by the industry.

Pemco is the first frit manufacturer to install such facilities for testing and research.

*Pemco Service* is available to you through the Pemco Engineer in your area.

# Diffusion of hydrogen through ceramic coated nickel

study reveals values in ceramic finishing metallic parts designed for use in high temperature devices

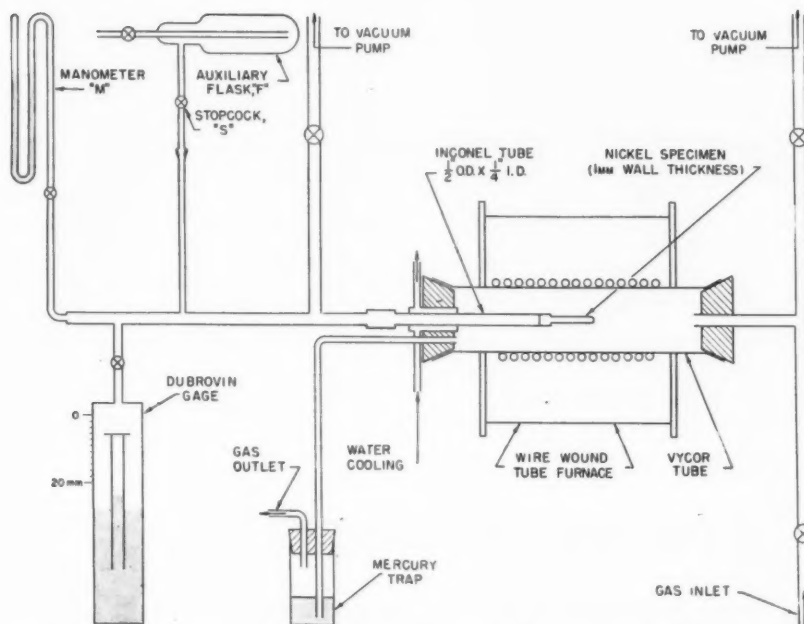


DIAGRAM OF APPARATUS used in test shows evacuated system at left attached to open end of nickel tubing. This is placed in furnace containing hydrogen atmosphere. Pressure and volume measuring devices determine the diffusion rate.

AN investigation of the diffusion rate of hydrogen through ceramic-coated nickel has recently been completed by J. R. Cuthill and R. W. Dixon of the National Bureau of Standards. The study, which was carried out as part of a larger program sponsored by the Wright Air Development Center, reveals that the ceramic reduces the hydrogen flow by a factor of about 20. The results indicate that it would be worthwhile to apply ceramic coatings to metallic parts of high-temperature devices to minimize the diffusion of

hydrogen into otherwise hermetically sealed systems.

In an NBS investigation of the creep rates of ceramic-coated metals at high temperatures, test specimens were exposed to various atmospheres, including hydrogen. Investigators have reported differences in the creep rates of bare metals in hydrogen and in air, and have attributed this difference to the oxide layer formed on the metal.

An alternate explanation of the difference is that the metal absorbs some of the hydrogen, thus affecting the creep

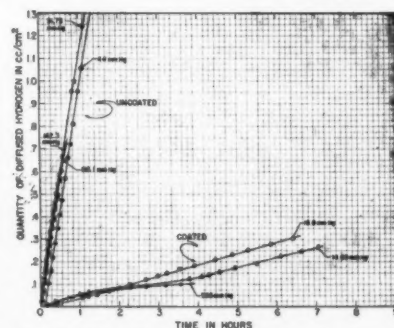
rate. Because the hydrogen diffusion through the ceramic coatings on the Bureau's specimens was unknown, tests were undertaken to measure the permeability of both coated and uncoated nickel to determine how much the ceramic inhibits the hydrogen flow.

High-purity nickel was chosen for the study because it is readily permeable to hydrogen at elevated temperatures. A tubular specimen of this material, closed at one end, was placed in a furnace; the open end of the tube was attached to an evacuated system. The system was equipped with pressure and volume measuring devices to determine the hydrogen diffusion rate through the specimen wall. The outside of the specimen was surrounded by hydrogen at about atmospheric pressure, and the furnace was heated to 1400°F.

## Three tests made on specimen

Three tests were made on the uncoated specimen with hydrogen enveloping the outside of the tube while a

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GRAPHIC RESULTS showing hydrogen diffusion rates for both coated and uncoated pieces. Coating cuts flow by a factor of about 20.





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Big thing, though, is not Cameo's saving in burning hook expense. It's their saving in spoiled ware and lost furnace time. With these lightweight Inconel al-

loy hooks, droppage of ware and pile-ups in the furnace prove rare. The hooks don't shed scale either.

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**More information?** Write today for "Keeping Costs Down When Temperatures Go Up." This Inco booklet contains many practical suggestions on extending equipment life.

**The International Nickel Company, Inc.**  
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## Inconel...for long life at high temperatures

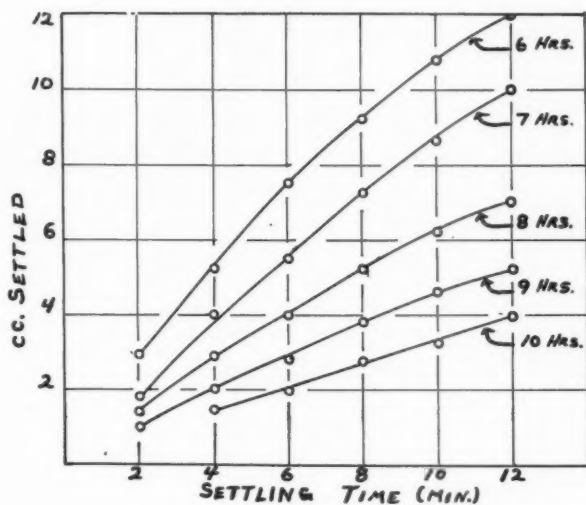


FIGURE ONE

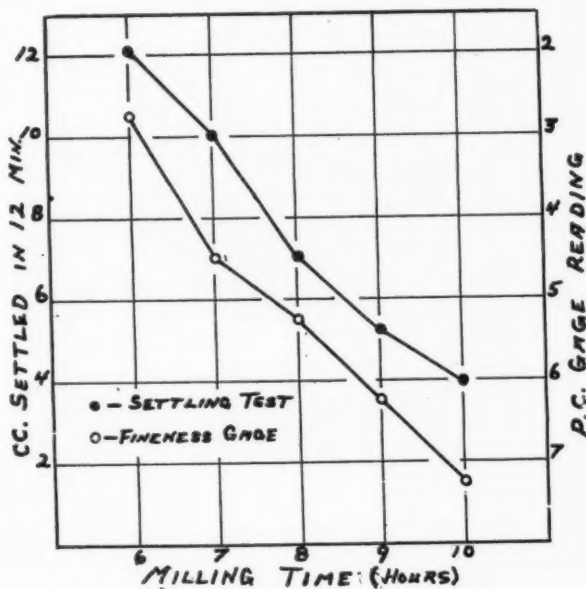


FIGURE TWO

## Control of sub-sieve fine grinding

author explains background and mechanics of settling test for use in determining relative fineness of finely ground enamels

by Harry Afflerbach • LABORATORY DIRECTOR, INGRAM-RICHARDSON, INC.

A CONTROL test to be used in the determination of the relative fineness of finely ground enamels need not be one which indicates the actual particle sizes or particle size distribution but rather one which is reliably accurate, which will give reproducible results, and which can be performed rapidly. One test which meets these requirements is the Settling Test. The test to be discussed here is an adaptation of tests previously described by Cooke<sup>1</sup> in 1925 and by Whitehead<sup>2</sup> in 1939. The tests they proposed were correlated to results obtained by sieve analysis or screen testing and found to be reliable and suitable for control of fineness of grind in the range measurable by the use of 200 or 325 mesh sieves.

The same general test has been found reliable as a control test for the degree of fineness attained when grinding time is extended to two to three times the normal grinding time required to attain a fineness of two to four grams as determined by the PEI Screen Test. The Settling Test is not intended to deter-

mine actual particle size, but rather to act as a control test based on a reference or standard determined by experience.

### Apparatus required for test

The apparatus required to perform the test is simple and consists of only a 100 cc. graduated cylinder, a 50 cc. transfer pipette, a 5 cc. graduated cylinder, a medicine dropper, and a watch or stop-clock. A lamp with focusable beam is desirable but not necessary. The materials required consist of water glass solution, preferably 40° Be., distilled water, and a 1% solution of phenolphthalein in either methyl or ethyl alcohol.

The procedure for the test may be "standardized" locally for convenience of operation. Data presented here were obtained using the following "standard" procedure: Measure 70 cc. distilled water into graduated cylinder, add 3 cc. of sodium silicate solution prepared by diluting 2 cc. of 40° Be. material with 3 cc. of distilled water, and fill to the 100 cc. mark with enamel slip having a specific gravity of 1.69 to 1.71. Add

1 cc. of the phenolphthalein solution as an aid in determining the level of the settled solids, stopper graduate and agitate thoroughly for 20-30 seconds by shaking and inverting.

Place graduate on level location and allow to settle. Read and record volume of solids settled at two minute intervals for a total of twelve minutes. Settling time may be measured by the use of a stop-watch, stop-clock, or ordinary watch with second hand. In actual production use of the test, the total volume settled during some standard length of time (e.g. 10 or 12 minutes) is taken as the endpoint of the test.

### Definition of test and results

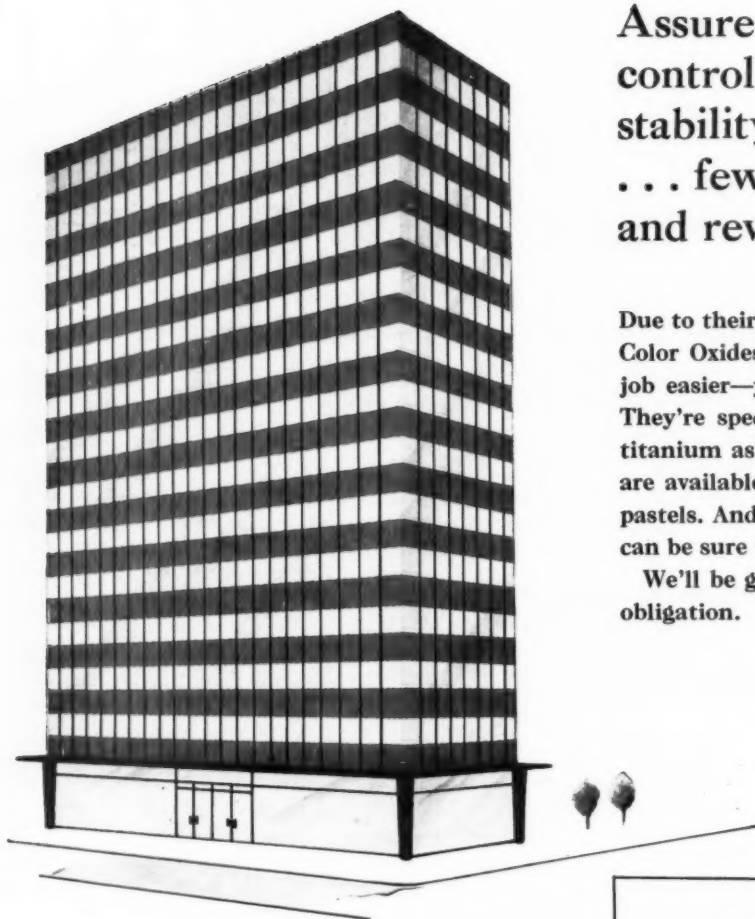
Figure 1 shows the effect of increased grinding time on rate of settling as measured by the Settling Test. One white cover coat mill was sampled at hourly intervals from six to ten hours total grinding time and the settling curves plotted for each sample. As would be expected, the rate of settling continuously decreased as the particles of

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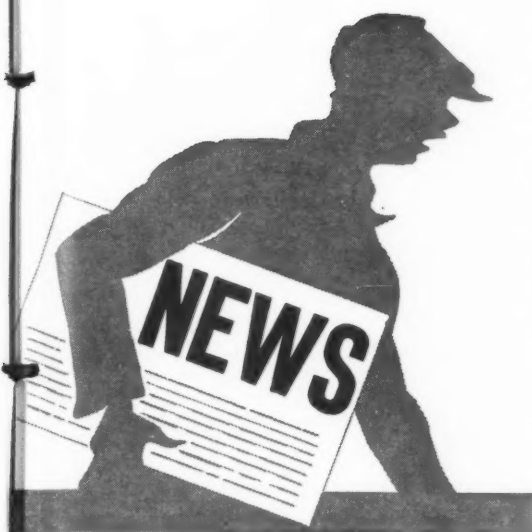
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## A NEW DEPARTURE

### IN VACUUM CLEANERS

Alex Lewyt, Lewyt Corp., New York vacuum cleaner manufacturing firm, has a new type of cleaner in the hopper which, he claims, "will be about the size of a shoe box, and its dirt collection will have to be removed once in one or two years." Lewyt revealed that his firm has been experimenting with such a cleaner due five years from now.

"No Buck Rogers ideas are contemplated," he said. "We're not thinking of employing atomic energy, although such power may be used in household appliances at some far future date. Right now we have set up a five-year research and development program, applying our skills to a practical cleaner for home use in 1962."

## PLANS FOR CHICAGOLAND FAIR

Chicago's Navy Pier will be the site of the Chicagoland Fair, scheduled to be held from June 28 to July 14. The exposition, sponsored by the Chicago Association of Commerce and Industry, will focus attention on the "New Chicago," the heart of business and industry for the world.

Richard Revnes, fair director, explained that the metropolis, now the largest and most diversified manufacturing center in the world, gains unlimited economic growth potential as the St. Lawrence Seaway becomes a reality. He outlined the following objectives for the fair! Attract new buyers for Chicagoland products; Point out Chicagoland's suitability for new plants, warehouses, and headquarters; Demonstrate Chicagoland's quality as a place to live, work, and play; Emphasize the civic achievement and leadership of

Chicagoland businessmen; Acquaint more Chicagoans with the good points and facilities of their city; and demonstrate the impact of the completion of the St. Lawrence Seaway, the World port of Chicago, and the Calumet-Sag Channel.

The fair will have five miles of colorful exhibits, built around one of six themes, with each highlighting a major objective of the exposition. A Chicagoland Fair office has been opened in room 516, 8 S. Michigan Ave., Chicago 3, Ill., to handle reservations and sale of space.

## AHLMA PRESIDENT, OFFICERS

### AND BOARD MEMBERS FOR '57

B. J. Hank, president of Conlon-Moore Corp., and 1956 president of the American Home Laundry Manufacturers' Association has been reelected association president for 1957.

Other officers elected include Ray G. Halvorsen, executive vice president, Hamilton Manufacturing Co., as first vice president; Hal B. Miller, general manager, Home Laundry Department, General Electric Co., second vice president; Homer L. Travis, vice president, Sales, Kelvinator Division of American Motors Corp., third vice president; Gregory M. Sheehan, manager finance, Home Laundry Department, General Electric Co., treasurer, and W. Homer Reeve, vice president and manager, Easy Washing Machine Division of The Murray Corporation of America, past president.

In addition, eight other directors were elected to make up a Board of 14 members. Other directors who will serve during the 1957 year include Elisha Gray, president, Whirlpool-Seeger Corp.; R. M. Gottlieb, vice president in charge of sales, Ironrite Inc.; Roy A. Bradt, vice president, marketing, The Maytag Co.; J. M. Hufnagel, manager, Home Laundry Sales, Philco Corp.; J. B. Murray, executive vice president, Speed Queen Division of McGraw Electric Co.; Jack D. Lee, manager, Laundry Equipment Department, Westinghouse Electric Corp.; Harold Leisey, general manager, Beam Manufacturing Co., and R. H. Smith, supervisor, Washers & Dryers, Merchandising Department, Frigidaire Division of General Motors.

## HEATING & AIR CONDITIONING EXPOSITION SCHEDULED

The 13th International Heating & Air Conditioning Exposition is scheduled to be held Feb. 25-March 1 at the International Amphitheatre, Chicago, Ill.

## COLORS SINKS COMPLETE

### KITCHEN COLOR STYLING

Complete color styling of Republic Steel Kitchens is now possible with porcelain rolled-rim sink tops and flat-rim drop-in sink bowls in color. The new units are offered in the three popular colors now in use on Republic cabinets — Tempo Turquoise, Largo Yellow, and Prelude Pink.

Double-bowl porcelain rolled-rim sink tops in color are available in 42, 48, and 66-inch widths, while single bowl sink top sizes are 42 and 54 inches. Single-bowl drop-in bowls are of one-piece, pressed steel construction with acid-resistant porcelain finish. The new colored units round out Republic's full line of Formica, stainless steel, and white porcelain sink tops, and stainless steel and white porcelain drop-in bowls.

## HOME OWNERS DECLARE WHITE

### BATHROOMS OUT OF STYLE

Young home owners now prefer more colorful bathrooms to drab white ones, the Plumbing Fixture Manufacturers' Assn. reports.

A recent survey of one thousand persons, aged 20 to 40, shows that seven out of every ten want color fixtures. Fewer than three in ten desire white fixtures. The remainder indicate they like both. This illustrates a growing trend toward more glamorous bathrooms, according to the PFMA. In 1953, for example, less than two of every ten bathtubs sold were colored. Presently, this number has jumped to almost four.

## DESIGN ENGINEERING SHOW

### SCHEDULED FOR MAY 20-23

The Design Engineering Show, scheduled to be held May 20-23 in the New York Coliseum, New York, will, it is reported, be among the five largest expositions in the country. Held for the first time in Philadelphia last spring, the show will run concurrently with a conference on innovations in the design engineering field. This latter will be sponsored by the Machine Design division of the American Society of Mechanical Engineers.

The show, which will occupy three floors of the Coliseum, will include mechanical, electrical, hydraulic, and pneumatic components; metallic and non-metallic materials; fasteners; finishes and coatings; shapes and forms; and accessories to product development. Nationally known firms, too numerous to mention, will exhibit in the show, and virtually every major manufacturing

company in the country is expected to have its engineers and executives attend, it is predicted by the sponsors.

### **SERVEL CUTS FACTORY PRICE ON AIR CONDITIONING UNITS**

Reduction of the factory price of the three and one-half ton gas-operated "Sun Valley" air conditioner by seven per cent has been announced by A. J. DeFino, vice president and general manager of Servel, Inc., Evansville, Ind. In revealing the reduction, he pointed out that basic raw material prices have increased from five to seven per cent, with wages up six cents per hour, yet the company, through a capital investment which doubled the rate of production, and by means of improved manufacturing techniques and design changes, has been able to lower the cost of the product and increase its performance efficiency.

As one example of several recent Servel advancements which have served to lower costs and, at the same time, step up performance, DeFino mentioned the introduction of an entirely new flat-tube type of generator. Less expensive to make than the previous cylinder-type tube, the new flat-tube generator provides more heating surface in the same space, and responds more quickly to heating and cooling demands.

### **REPUBLIC STEEL KITCHENS EXPANDS PRODUCTION CAPACITY**

Republic Steel Kitchens has announced an expansion program which will increase steel kitchen cabinet production capacity by 33 1/4%.

The program will be in the form of additional facilities being installed at Republic Steel Corporation's Berger Division Plant No. 2 in Canton, O., home of Republic Steel Kitchens.

More than half-a-mile of additional conveyor equipment will move Republic cabinets from original assembly points to final crating lines. The conveyor will serve new Bonderizing equipment and an electrostatic paint spray system. More air conditioning equipment will be installed.

The additional equipment will necessitate alteration and enlargement of Berger Division Plant No. 2, it is stated.

### **PLUMBING - HEATING - COOLING**

May is going to be a very special month for the building industry. For the first time in history, the industry will concentrate its nationwide promotional efforts on the job of telling the

American people that they should keep their homes modern and up-to-date.

May as "Better Your Living Month" is sponsored by Operation Home Improvement.

In order to channel as many dollars as possible into the plumbing, heating, and cooling industries, May has been designated as Plumbing-Heating-Cooling Month by the Coordinating Committee of the All-Industry Plumbing and Heating Modernization Committee.

"Right now is the time to make your plans for tying in with May as Plumbing-Heating-Cooling Month," says Kenneth H. Clark, Des Moines, Iowa, chairman of a Special Coordinating Committee.

### **NEW FINISHING EQUIPMENT ASSOCIATION IS FORMED**

A group of companies engaged in the production of industrial finishing equipment have organized a not-for-profit corporation under the name "Industrial Finishing Equipment Manufacturers Association."

The new trade association has been formed to represent the manufacturers of spray booths, ovens, parts washers, dust-collecting equipment, air supply systems, paint handling equipment, electrostatic equipment, and all manufacturers of products having to do with metal preparation and organic finishing equipment.

The final organization meeting took place in Detroit, Michigan, with the following companies listed as charter members:

Newcomb-Detroit Company  
Peters-Dalton, Inc.  
Despatch Oven Company  
J. O. Ross Engineering Corp.  
R. C. Mahon Company  
George Koch Sons, Inc.  
Spra-Con Company  
B & S Fabricators Company  
Schmeig Industries, Inc.  
C. A. Dauer Company  
Foundry Equipment Company  
N. Ransohoff, Inc.  
Gallagher-Kaiser Company  
Metalwash Machinery Co.  
Burdett Manufacturing Co.

The following officers and board of directors were elected for the year 1956-1957: president and director, John Harrison, vice-president, The Spra-Con Company; vice-president and director, William Hurdlein, R. C. Mahon Company; vice-president and director, C. J. Schmidt, J. O. Ross Engineering Corp.; secretary and director, A. L. Newcomb, Newcomb-Detroit Co.; treasurer and

director, Robert L. Koch, George Koch Sons, Inc.; and director, R. Richards, Peters-Dalton, Inc. Mandel L. Anixter of the law firm of Chapman, Anixter & Delaney was appointed counsel and executive secretary of the association with main offices in Chicago.

Under the charter granted to the association by the State of Illinois corporation department, the purposes for which the organization has been set up are as follows:

- (a) To promote the general welfare of the industry and, without limitation to the generality of the foregoing, encourage high criteria of excellence in engineering, safety, and industry hygiene.
- (b) To improve its service to the public.
- (c) To cooperate with government officials in furthering the national welfare.
- (d) To carry out other activities recognized as lawful for trade associations.

### **VanDERAU RECEIVES DUAL CHAMBER OF COMMERCE AWARDS**

C. L. VanDerau, general works manager of Westinghouse Electric Corp., Mansfield, Ohio, recently was awarded life membership by both the Mansfield Chamber of Commerce and the Ohio Chamber of Commerce. He became the fourth man in the 49-year history of the Mansfield Chamber of Commerce to be voted an honorary life membership by the board of directors. It was presented as "long due recognition" of twenty-one years of service to the group. He's been on the board of directors of the Mansfield Chamber for eighteen years and has served as president for two terms. He also served as vice president of the Ohio Chamber of Commerce and has been a member of their executive board.

### **GE THEATER TO FEATURE NATIONAL ELECTRICAL WEEK**

General Electric will use its G. E. Theater, one of the nation's top television shows, to launch a company-wide program of activities in support of National Electrical Week, (February 10-16), Merrill E. Skinner, chairman of the National Electrical Week committee, announced.

The NEW message will reach an estimated 33 million viewers via the General Electric Theater on Sunday evening, February 10, first night of the industry-wide drive to make the people of the nation aware of the present and potential

benefits of electricity. The observance also coincides with the 110th birthday of Thomas A. Edison on February 11.

### COMPRESSOR BODY SHIPMENTS UP IN '56, ARI REPORTS

Manufacturers' shipments of compressor bodies, reported to the Air Conditioning and Refrigeration Institute for the period Jan. 1 through Sept. 30, 1956, totalled 3,860,273 units, not including compressors for household refrigerators, a gain of almost 36 per cent over the same period figure of 2,844,741 units reported in 1955, according to George S. Jones, Jr., managing director of ARI.

Of the 1956 total, 218,489 compressors were for automotive air conditioning, compared with reported shipments for the entire year 1955 of 255,371 automotive units.

### WESTERN TOOL & STAMPING BUYS NEW MONARCH MACHINE

The Western Tool and Stamping Co., Des Moines, Iowa has purchased the New Monarch Machine and Stamping Co., a stamping and metal finishing firm located at 406 Southwest Ninth St., Des Moines. The acquisition of the firm is another by Western in increasing production facilities and providing for future diversification in new products.

The New Monarch firm will retain its individual identity, and will continue manufacturing operations as at the present time, being operated as a wholly-owned subsidiary of Western Tool and Stamping. Western manufactures lawn mowers and related equipment; and New Monarch Machine is presently producing metal stampings, basement windows, storm sash, etc.

The directors of Western Tool and Stamping Co. announced the election of the following officers of the New Monarch Machine and Stamping Co.; E. W.

Kolls, chairman of the board; Lee A. Shelton, president and general manager; J. E. Kolls, vice president; H. D. Bright, treasurer; Arvid C. Anderson, vice president, sales; J. E. Scanland, vice president, engineering; and D. W. Herron, secretary.

### INCREASED USE OF METAL STAMPINGS PREDICTED

Savings of up to a half-billion dollars resulting from greater use of metal stamping methods by American industry were predicted by Carter C. Higgins, president and general manager of Worcester Pressed Steel Co., Worcester, Mass. In commenting on the business outlook for 1957, he foresaw a shift of 15 per cent from such fabricating methods as casting and machining to metal stamping. Many more concerns are turning to metal stampings, Higgins declared, because it is the ultimate in high-speed, low-cost production. A survey of more than 1,000 companies, conducted by the Presteel firm, also revealed that more companies find it less costly to buy metal stampings from specialists than to do their own stamping, he said.

"Titanium alloy experiments conducted by Worcester Pressed Steel for the Federal Government during the past two years have resulted in real technical progress," Higgins revealed, "opening the way for use of the alloys in a variety of new applications. Titanium alloys are becoming increasingly important in airplane construction because of their favorable strength-to-weight ratio."

### LF&C BUYS CONTROL IN CANADIAN APPLIANCE FIRM

The purchase of a controlling interest in Ever-Bright Limited, Toronto, Canada by Landers, Frary & Clark, New Britain, Conn., was announced

today by R. L. White, chairman, and Bret C. Neece, president.

Ever-Bright Limited is a producer of electric appliances and housewares, serving the Dominion-wide markets. Products of the company include electric tea kettles, irons, fry pans, coffee makers, toasters, and a complete line of stainless steel cookware.

The present management of the company, John Hirschorn, president; Norman Green, secretary and treasurer; and John Calvert, sales manager, will continue to serve in their respective capacities.

### PEI YEAR END STATEMENT SHOWS SUBSTANTIAL INCREASES

In 1956, total dollar volume for the porcelain enamel industry showed a 25-million dollar increase over the 440 million dollar figure achieved in 1955, according to James W. Vicary, president of the Porcelain Enamel Institute.

In a regular year end industry outlook statement, Vicary pointed out that this high level of business activity is expected to continue into 1957, with dollar volume for the industry approaching the 500 million dollar mark.

Major forces contributing to this booming business have been the wide acceptance by architects and builders of porcelain enamel curtain wall construction, and the growing consumer demand for appliances and household products. The rapidly increasing market for major appliances accounts for the greatest dollar volume of business in the porcelain enameling industry. More than half of the porcelain enameling done in the country goes into this area.

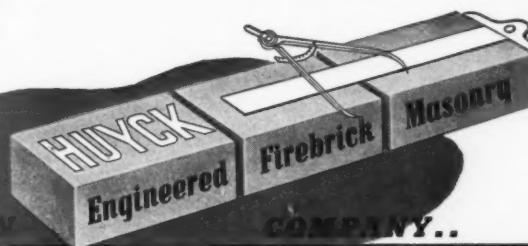
Losses felt on the free standing range market have been more than regained by the increased use of colored porcelain enamel on other major appliances, and the boom in home laundry equip-

more news Page 35 →

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Out of our laboratories come a wide range of frits used on a wide range of products in our own enameling plant. Here, you have that rare combination of science working hand in hand, day after day, with old man practical experience. This "big edge" is paying off for our Frit Customers.

## INGRAM-RICHARDSON, INC.

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## Industry News... → from Page 33

ment, the Institute president pointed out.

Vicary said that the year 1957 promises to be a banner period for porcelain enameled water heater tanks.

The porcelain enamel industry also looks to increased application on small appliances during the next 12 months. In 1956 several manufacturers introduced, for the first time, porcelain enameled toasters, hot plates, and other small appliances in color.

In 1956, total dollar volume for architectural porcelain enamel is estimated at 60 million, an increase of more than 20 per cent over 1955. From all indications, 1957 can expect a 10 to 12-per cent increase over the 1956 figures, according to Vicary.

### McBRIDE GIVEN U. S. FEDERAL RESERVE POST

Pierre B. McBride, president of Porcelain Metals Corp., Louisville, Ky., was recently appointed chairman of the board of the Federal Reserve Bank, St. Louis, Mo.

McBride has lived in Louisville since 1927, when he came here from Cleveland, Ohio. He organized the Enameled Products Co., and the Wabash Sanitary Tray Co., consolidating them into the Porcelain Metals Corp. in 1934. McBride is an overseas veteran of World War I, and is active in fraternal and community affairs.

election of John R. Caulk, Jr. to the newly-created position of executive vice president and W. A. Vormehr, Jr. as vice president of manufacturing.

John P. Finley, Jr., has begun work as a general foreman in the porcelain enameling department for The Maytag Co., Newton, Iowa, assuming the ceramic engineering duties in that department. He formerly was superintendent of the enameling department, electric range division, for Philco Corp., Mt. Clemens, Mich.

The election of Henry M. Haase, vice president in charge of engineering and research for Borg-Warner, as president and chief executive officer of the York Division of Borg-Warner Corp., York, Pa., has been announced. Haase will continue to be a vice president of Borg-Warner, but in the future, will not direct the parent corporation's research and engineering activities.

The election of Richard W. Simmons to the board of directors of Cook Electric Co., Chicago, Ill., was announced here by Walter C. Hasselborn, president. Simmons is a partner in Blunt, Ellis & Simmons investment security firm with which he has been associated since 1948. Previously, he was a vice president of Lee Higginson Corp., which he joined in 1928. Simmons is also a director of Western Tool & Stamping, Inc., Des Moines, Iowa, and David White Instrument Co., Milwaukee, Wis.

Francis A. Noll has been appointed director of engineering of Amana Refrigeration, Inc., Amana, Iowa, it was announced today by George C. Foerstner, executive vice president. Engaged in household refrigeration engineering work for nine years, Noll joined Amana a year ago as chief cabinet engineer. In this capacity, he has been responsible for designing the cabinets of Amana freezers, freezer-plus-refrigerators, and built-in freezers and refrigerators.

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## INDUSTRY PERSONALS

Stanley H. Hobson, president of the Geo. D. Roper Corp., Rockford, Ill., was one of the principal speakers at the Fifth Annual Better Business Relations Conference at Gearhart, Ore., Oct. 10. The affair was sponsored jointly by the Chamber of Commerce of the United States and the Portland, Ore., Chamber of Commerce.

John H. Wall, executive vice president and general manager of the Home Appliance division, has been appointed general manager of Servel. Arthur A. Pieper, who has been controller since last March, has been elected vice president in charge of finance to succeed William H. Schrader, who has resigned. Harold J. Luke, formerly assistant to the vice president in charge of finance, has been promoted to treasurer and assistant secretary.

Jim Austad has been named service supervisor of automatic washers and dryers in the Maytag Company's Newton, Ia., service department. Austad, who had served as product service instructor at Maytag since November, 1955, replaces Lou Watkins, who will have left the company January 11 to open a Maytag appliance store in Maryville, Mo.

Walter D. Krauter has been appointed sales manager-refrigerator division, Admiral Corp., it was announced today by J. R. Oberly, vice president-appliances.

He served in various executive assignments at Gibson Refrigerator Co. during the past 24 years, and left the position of product manager, general appliance division, to join Admiral.

Bryant Manufacturing Co., Indianapolis, Ind., has announced the appointment of Gerald F. Deer as sales training manager for the heating and air conditioning company. Before joining Bryant, Deer held various sales posts with Stewart-Warner's U. S. Machine Division, Lebanon, Ind.

Frank J. Nunlist, executive vice president of Mueller Climatrol, today announced the appointment of Curt Hoerig as manager of manufacturing. At the same time, Nunlist named Carl Quick general superintendent. Both positions were newly created.

C. F. Daugherty, refrigeration engineer at Armstrong Furnace Co., Columbus, Ohio, has been elected to the chairmanship of the Membership committee of the American Society of Refrigeration Engineers.

W. B. McMillan, president and chairman of the board of directors of Hussmann Refrigerator Co., announced the

KRAUTER



McBRIDE

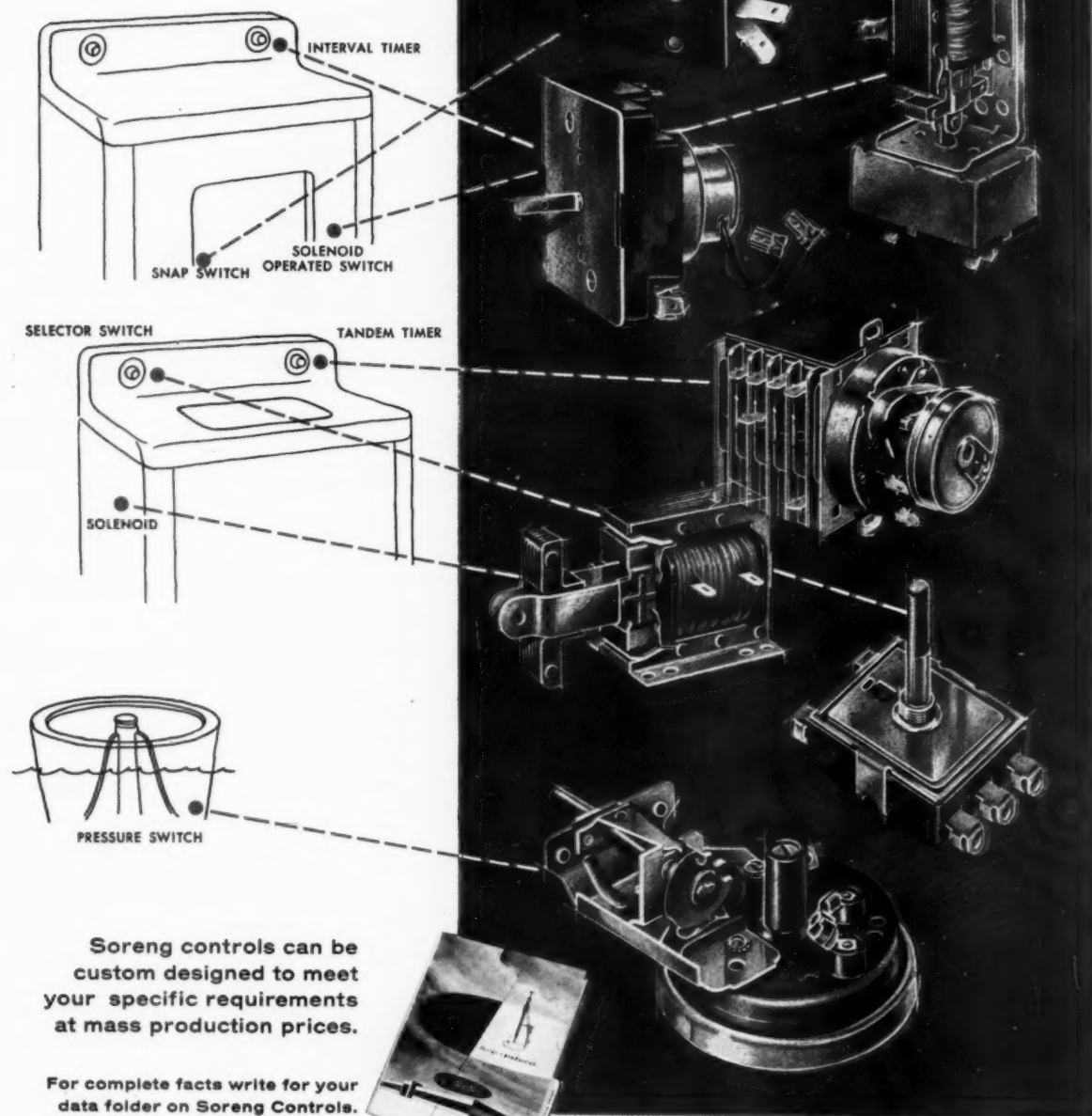


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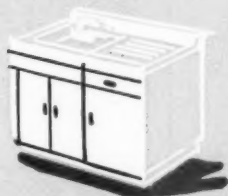
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Working side by side with enamel plant personnel is a part of Chicago Vit service that can't be measured in terms of dollars and cents. But it's important to the enamel plant operator, and it encompasses every phase of enamel processing. Chicago Vit customers have learned that this specialized service has helped them to reduce costs and increase production in many ways year in and year out. And the beauty of it all is that it's never further away than the nearest telephone.

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signs

## Industry Personals...

→ from Page 35

Fairbanks, Morse & Co. announces the appointment of *R. H. Beadle* to the position of chief engineer, Diesel Engineering department, with headquarters at the Beloit, Wis., works of the company. Beadle has been associated with Fairbanks, Morse & Co., since 1939, specializing in the diesel engineering field. During this time, he served in various engineering capacities and, prior to his present promotion, held the position of assistant superintendent and superintendent of the Diesel Experimental department.

Beadle's thorough knowledge of the company's entire diesel product line, and his ability to analyze difficult engineering problems, are among the outstanding qualifications he brings to his assignment. He replaces *E. L. Dahlund*,

who recently resigned to accept an executive position with another company not connected with the diesel industry.

*Gordon Shewman* has been appointed district manager for the Typhoon Air Conditioning Co., Division of Hupp Corp., in southern Illinois, Missouri, Oklahoma, and Kansas. The appointment was announced by *Mark E. Mooney*, vice president in charge of sales for Typhoon.

*Frank F. Elliott* has been designated chairman of the board of directors of Crane Co., and will be succeeded as president of the company by *Neele E. Stearns*, currently vice president for planning and development of the Inland Steel Co. Both men assumed their new duties effective January 1.

*Elliott*, whose career with the Chicago-headquartered manufacturer of valves, plumbing, and heating equipment covers a span of 34 years, has been president of the 101 year old Crane Co. since June 1, 1955.

During World War II, Stearns was a member of the American steel mission which was sent to England by the U. S. government in 1942 to study the British system of iron and steel control. The original Controlled Materials Plan for allocation of scarce raw materials grew out of the missions' recommendations.

The election of *Henry M. Haase* as vice president in charge of engineering and research for Borg-Warner Corp. was announced by *Roy C. Ingersoll*, chairman of the board. Prior to joining the company in January, 1955, he had been president and general manager of McCray Refrigerator Co., Palmer Manufacturing Corp., and subsidiaries.

In his new capacity, Haase will direct the corporation's program of product planning and engineering research and development, including general supervision over the newly-built Borg-Warner research center in Des Plaines, Ill., and the Petro-Mechanics research division in Los Angeles.

*Richard W. Chamberlain* now is national sales representative for Westinghouse laundry equipment, it was announced by *J. J. Anderson*, manager of the Westinghouse major appliance division. Duties of Chamberlain, who started with the firm in the graduate student training program in 1954, will include the responsibility of carrying special promotions and national sales programs to the field organization. In this capacity he will report directly to *Jack D. Lee*, manager of the laundry equipment department.

One of the foremost pioneers in modern heating and air conditioning in Canada, *Grant E. Cole*, 59, executive vice president and general manager of the Trane Co., of Canada, Ltd., has retired effective Jan. 1 because of ill health. *R. James Trane*, president of the Canadian organization, has announced.

Cole has been with Trane 32 years and has been in the forefront of heating and air conditioning progress in Canada during that time. He joined The Trane Co. as Canadian representative in 1924. At that time, his own company was manufacturing the Cole Tilting Trap for use in heating applications.

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## Industry News...

→ from Page 35

### 14,000,000 PRINTED CIRCUITS BY CRONAME IN 1957

The unprecedented demand for etched circuits by manufacturers of appliance and electronic products has convinced the executives of Croname, Inc., Chicago circuit board manufacturer, that their production goal must be upped to meet the market, according to Lester R. Gasper, president.

A production capacity of 14 million etched type printed circuits during 1957 has been tentatively slated for production departments using present and augmented facilities, it was announced.

According to Gasper, Croname's circuit production, during the month of December, had reached an alltime high. Shipments were running at approximately 50,000 per week. He termed the reappraisal crucial, and the increased production goal a realistic approach to the reduction of cost to manufacturers by utilizing mass production techniques on circuits.

"We have barely scratched the surface in circuitry production," according to Leroy E. Dahlberg, vice president in charge of factory management. The company has a new factory, now under construction, in Niles, Ill. The new plant will cover eight and one-half acres of ground on a 33-acre site.

### FURNITURE SHIPMENTS UP

Year end figures will show that household furniture shipments by furniture manufacturers reached an all-time high in 1956, it was announced Dec. 28 by John M. Snow, executive vice president of the National Assn. of Furniture Manufacturers'. Both volume and payrolls were estimated at eight per cent higher than in 1955, the previous record year. Employment was five per cent higher, indicating increased industry efficiency per man hour, Snow said. The estimates are based on complete reports now available for the first 11 months, with nothing to indicate that December's final report will materially affect the total.

### P.M.I. TECHNICAL MEETING

Safety and technical papers, plus awards and plant tours, will highlight a Pressed Metal Institute three-day technical meeting in Cleveland, March 6, 7 and 8, 1957. All business sessions will be held at Hotel Carter. Approximately 400 stamping designers, engineers and production men are expected to attend,

according to H. A. Daschner, managing director of the institute. Attendance at these meetings is not limited to Institute members, but is open to anyone in the stamping industry, states Mr. Daschner.

For additional information and details about registration, contact the Pressed Metal Institute, 3673 Lee Road, Cleveland 20, Ohio.

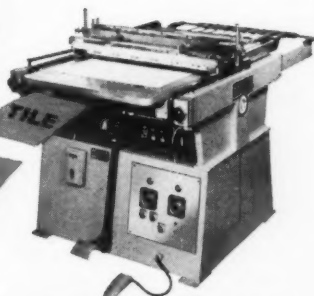
### RHEEM GIVES AWARDS

Nine members of the Rheem sales organization received special awards for outstanding performance at the annual

sales meeting of the Home Products division of Rheem Manufacturing Co., Chicago, held recently.

Of the seven men receiving awards for sales in excess of \$1,000,000 during 1956, J. M. Chinn, Dallas, Tex., and D. R. Strong, Cuyahoga Falls, Ohio received the awards for the fifth consecutive year. Other Rheem sales personnel receiving the \$1,000,000 award were: D. S. Mobley, Phoenix, Ariz.; W. H. Olson, Chicago; W. E. Goetz, Minneapolis, Minn.; N. M. Burruss, Birmingham, Mich.; J. R. Halpin, Haworth, N. J.; and H. W. Mullaney, Greensburg, Pa.

for decorative  
and functional  
printing or coating



by Screen Process

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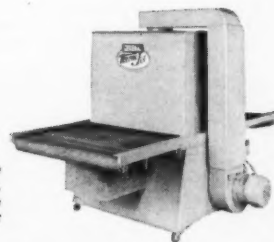
Decoratively, it will print intricate designs and patterns, in one or more colors, with speed, precision and efficiency. Heavy deposits of metallic, or fluorescent inks thus become practical with a General Decorator.

Functionally, it can apply the necessary deposits to certain integral parts which may be a part of the machine's operating mechanism. For example, the depositing of plating and acid resists in the manufacture of printed circuits and other etched products. Also, it can apply special coatings of adhesives, lacquers, and remoistening glue, overall or in restricted areas, at a productive rate that will speed manufacturing operations.

The possibilities for utilizing a General Decorator Press are almost limitless...and worth your complete investigation.



General Thermo Jet Dryers will reduce to seconds the drying time on many inks, coatings, resists, and adhesives which are applied by silk screen, roller coating or spray methods.



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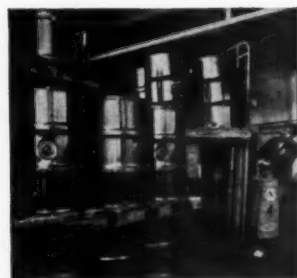


**AN AUTOMOBILE** requires a durable paint finish that retains its beauty under all weather conditions—ice and snow, sun and rain. ACP Granodine phosphate coating provides an excellent base for such a finish—greatly increases the adhesion of the paint to the metal.

ACP Granodine provides an excellent base for sparkling, durable paint finishes on automotive equipment, home appliances and industrial products by chemically converting steel surfaces to a nonmetallic phosphate coating. It not only greatly increases the adhesion of the finish, but also provides extremely good corrosion resistance even when used in conjunction with a relatively thin and flexible paint film. Granodine coatings are easily and economically applied to steel surfaces by dipping, spraying or brushing.

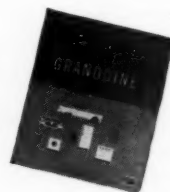


**IN THE HOME**, ranges, refrigerators, freezers, washers and dryers are among the many products whose sparkling finish is anchored to the metal by Granodine coating.



**IN INDUSTRY**, drums, materials handling equipment, machine tools and many other steel products used throughout the plant are protected by a Granodine base.

**LEARN ALL ABOUT ACP GRANODINE.** Bulletin 1380 describes the various types of ACP Granodine and gives information which will help you select the proper type for your particular application. Write for your copy today.



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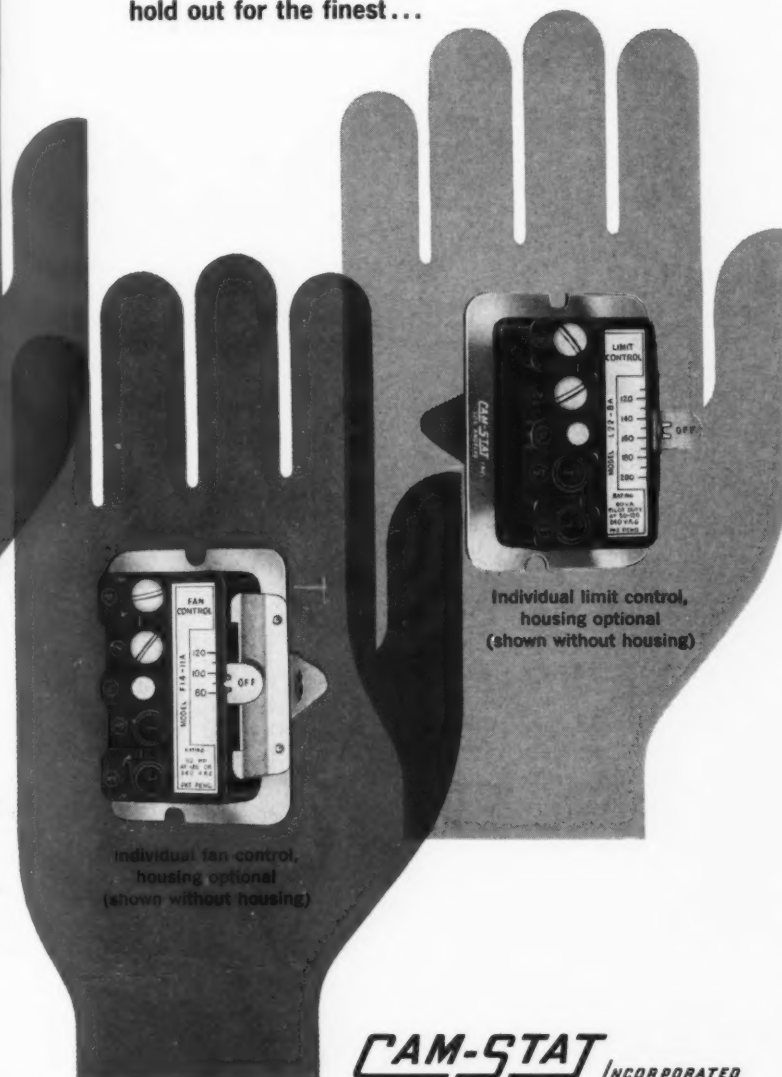
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Individual fan control, housing optional (shown without housing)

Individual limit control, housing optional (shown without housing)

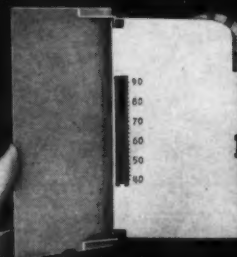
**CAM-STAT** INCORPORATED

Division of the Paul Henry Company

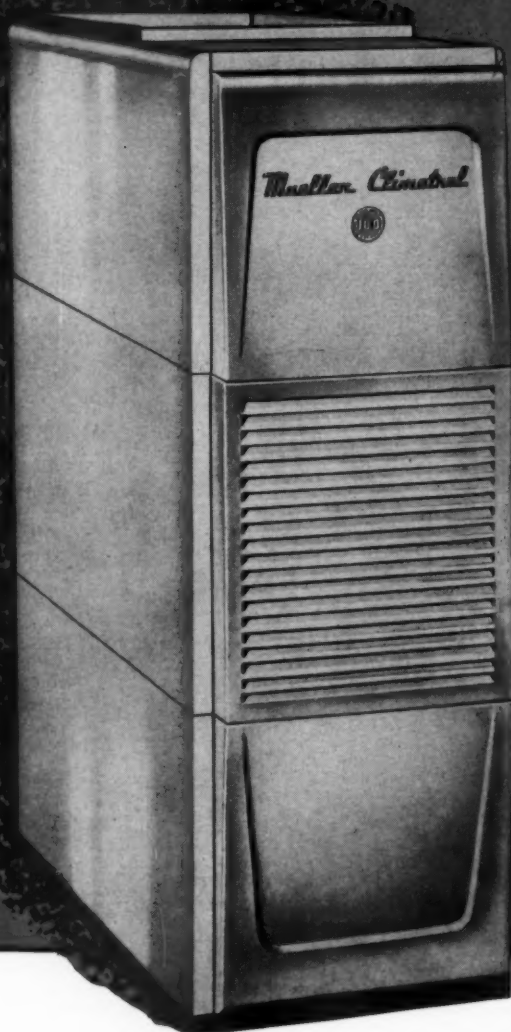
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# *"Correct Air Distribution for Economical Comfort"*



Mueller Climatrol Gas-Fired  
Winter Air Conditioner



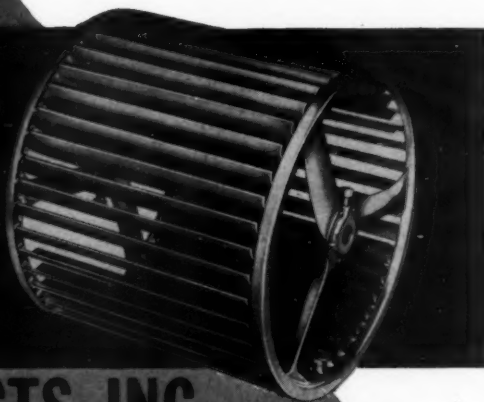
Morrison Blower used in  
"M C" Units.



"To build the finest in heating and air conditioning equipment" has been the motivating urge of Mueller Climatrol since 1857. Coupled with the most modern manufacturing techniques, top quality raw materials, the most rigid standards of engineering skills, and you have Gas-fired Furnaces and Air Conditioners at their very best.

Morrison is proud of Mueller Climatrol's continuous progress — proud too of the opportunity of working with them in the correct and economical distribution of air through their equipment.

What Morrison engineers have done for them and other outstanding manufacturers, it would be glad to do for you, in solving your heating and air conditioning problems.



**MORRISON PRODUCTS INC.**  
16816 WATERLOO RD. CLEVELAND 10, OHIO

**Mueller  
Climatrol**

**A special report by  
the editors of  
METAL PRODUCTS  
MANUFACTURING**



**"They make the weather behave"**

*a report on heating and air conditioning equipment manufacture*



Courtesy Milwaukee Sentinel

## The history of Mueller



THE PRIME PURPOSE of Mueller Climatrol for 100 years has been to provide a constantly improving standard of comfort for home, for store, and for factory, by developing constantly improving products and application techniques in heating and air conditioning. This continues to be our basic objective today and will become even more challenging as we look into the future. The accomplishment of this objective requires constant research and development, constant re-analysis of methods, not only to apply the results of generally advancing technology to our own ends, but also to be a willing contributor to such progress.

The story of our growth from a tiny combination hardware store and tinshop in 1857, until today, is an interesting illustration of the American free enterprise economic system. From the date of the introduction of our first cast iron tubular, self-cleaning double radiator coal fired furnace, our progress and our development have reflected a constant advancement and improvement in the technology of our industry and the changing economy of the country. As it has been true throughout the land, our last quarter of a century has been a period of tremendous acceleration in development, a speed-up that has no slow-down or end in sight in our time. On the contrary, the pace of improvement goes forward more rapidly each year. We are proud of our contribution to our industry and of our part in providing even better conditions for working and for living, irrespective of the vacillations of nature's climate.

With our company the age of exclusive coal fired equipment lasted for almost 65 years. This, too, was the period when

## We are on the threshold of an age of miracles in the



WE ARE ON THE THRESHOLD of miracles. The tremendous investment in research and development during the last decade has accelerated the progress toward effortless living in the home. Twenty-five years ago the average American home was operated with manual labor. There were seldom, if ever, mechanical aids present to simplify the housewife's tasks. Today's average home has twenty separate power plants — in the kitchen, in the laundry, living room, and bedroom.

Twenty-five years ago heating of the American home was accomplished with manual labor and back breaking labor at that. Today's home is heated almost effortlessly, except for the energy required to change the setting on a thermostat.

The age of miracles will probably have its greatest impact in providing a greater opportunity for clean, convenient, comfortable relaxation, for it is this kind of environment that makes a house a home.

Mueller Climatrol, as an active participant in a great and growing industry, is fully aware of all of the new responsibilities that it will surely have to assume from the new automatic creations of an advancing technology. These responsibilities not only

a satisfactory environment for people, but may also have to concern ourselves with the problems of proper temperature storage for clothing, proper temperature control for drinking water, for bath water, for food freezing, for waste disposal, for cook-

*by Frank J. Nunlist • EXECUTIVE VICE PRESIDENT*

require modernization of physical plants to take advantage of more complex, but at the same time, more economical and precise methods of production, but they also require re-analysis of personnel. We must recognize that the people of our organization in tomorrow's world, from stock boy to salesman, must be trained to handle increased responsibilities, which will come with the increasing complexity of our service to the public.

When we look ahead in our industry for a few years, we can recognize that we have responsibilities not only to provide

ing. And it is possible that all of these functions may have to be taken care of by one central energy conversion plant.

Markets like those of which I speak evolve gradually and consistently and not as if by magic.

Therefore, at the immediate present we must consistently provide improved products, improved education, for our customers.

On the following pages you will see some of the developments in our physical plant and in our production procedure expressed both in photos and technical

## Climatecontrol is written in the comfort of America

gravity hot water and gravity warm air heating were the standard of the era. In the late 20's we introduced gas and oil fired equipment almost simultaneously with the advent of our first forced circulation warm air furnaces.

These many products really came of age about fifteen years later, just be-

A year or so later, following a continuing program of study analysis and test by our research engineers, we were able to introduce a summer air conditioning plant, heralding our entry into this new field.

Our line of cooling equipment has now taken its place beside our line of furnaces and has already built a reputation of its

During the past few years major expansion and diversification in our product lines have given us a new breadth. Expansion in the air conditioning field has provided us with a new look. After 97 years of experience under the L. J. Mueller Furnace Company name, in 1954 we became the Mueller Climatecontrol Division of Worthington Corporation. This step provided us with even greater latitude and greater strength.

We are living in an era of change. We are in a constant state of improvement and development. We are proud of the youth of our organization, its bold thinking and its planned action, and the vigorous young maturity of our corporate body at the age of 100. With all the changes and advancements, however, the one basic element that has been a part of our organization since its inception has not changed. That is the constant maintenance of our integrity — our living and vital program of marketing products of which we can justly be proud — products that carry forward to new levels, our constant purpose of providing the best equipment for creating controlled indoor climate for homes, for stores, for factories.

*by H. P. Mueller, Jr. • PRESIDENT*

fore the beginning of World War II and the era in which we produced only heating comfort began to terminate immediately after World War II when summer air conditioning products were introduced. Thus, the automatic heating age as such, without summer air conditioning, lasted a mere twenty years.

Throughout the depression of the 30's, anticipating the developing demands of the market, we researched the refrigeration field. We did introduce units at that time pretty much on a field sampling basis, but certainly not for mass marketing. The first automatic heating plant that would burn either gas or oil began taking its welcome place in the home, in the office and in industry with a convertible furnace in 1946.

own in keeping with the Mueller Climatecontrol name. Now we are a vital and a strong part of the air conditioning industry, just as we have been a leader in the heating industry since 1857.

We are not looking over our shoulder at past achievements. Rather, we are facing the future that can only be an age of new wonderments in all fields. We face the future with an intent to continue a pattern of forward thinking. We face the future with the hope and a pledge to bring all of our imaginative, all of our creative ingenuity to bear on new developments in controlling the indoor climate. We are creating new achievements to add to our history of growth, a history in which I, personally, take great pride.

## in heating...cooling

reports by some of the men responsible for these operations. All of our achievements in this area give us great pride. An outstanding example is our new organic finishing department, where a vast improvement in method, taking advantage of the most modern in equipment and process, now allows us greater production of a better finished product at lower cost.

We have only made a beginning. We are not satisfied with our present plant or processes, knowing of the responsibilities that advancing technology is thrusting upon us, responsibilities that are sure to continue to increase in number and in value in the days ahead.

Skilled personnel with great judgment will be increasingly in demand. We are proud of our aggressive and dynamic organization as it exists today. We are pleased with the accelerated education programs now taking full effect in our organization. We are pleased with our improving

to Page M-19 →

Metal Products Manufacturing



MPM photo

# ENGINEERING



## Mueller Climatrol engineers play part in every p

**four areas of responsibility for engineering group provides them a place on each departmental team in this coordinated operation**



ENGINEERING is not, at Mueller Climatrol, solely a laboratory function. While much of our work may begin there—and we may return to the laboratory and the drawing boards many times — every departmental operation has Engineering as a participant. Basically, our department is charged with the following functions: (1) maintenance of product performance through continuous quality control testing of prior engineered products, (2) determination, in cooperation with management, of new products and their development,

and (3) analysis of existing components — a continuing study to assure proper choice of supplied components for our complete line of summer and winter comfort conditioning equipment.

*by Otto J. Ress •* MANAGER OF ENGINEERING

The field we are in dictates that we constantly improve our product and develop new methods of comfort control. We cannot invent in the laboratory, then try to sell what we invent. We must follow the trends and demands of the industry. Therefore, in most cases, our sales



**O. J. Ress**

management and field engineering staff determine a necessity for a product, and we develop to that demand. It can be seen that our product is not the same from year to year. This makes the maintenance of quality standards even more difficult and means that engineering at Mueller Climatrol is a vital, dynamic function instead of a theoretical, pure science.

#### Additional responsibilities of engineers

We are also responsible for modifications of our existing lines as decreed by advancement in housing concepts, and to provide for developments and situations revealed through our field engineering and sales contacts. Following each of these basic functions would require much more space than that allotted for this article. So, since so much of our work is in control of quality, we can study these functions and let them serve as an example of the intensity of our efforts in all our responsibilities.

#### Engineering's "Super-Check"

Each departmental report will explain the inspection and testing functions, as a regular safeguard for production, on the work processed. These inspection programs are set up by Engineering, in co-operation with the department supervisors, and are controlled by it.

In addition, we have the "super-check" and this is not only a careful check on all the "checkers," but also a control on actual

set of tests to assure optimum operation and compliance with specifications.

Results of this "super-check" are made up into a product review report. Should deviation from manufacturing requirements show up, this information is bulletined immediately to the department concerned, for complete check and correction.

These same laboratory facilities are also used in our group effort to study the developments in competitive products. All parts of competitive products under study, are scaled and photographed. A complete performance and firing check is made and analysed.

#### Study products of industry

As a final step, the competitive unit is then sent to Cost Analysis where a complete detailing of the estimated cost of manufacture is made for management's scrutiny.

This product review and the high standards insure the best in dealer and consumer acceptance. This concept of product responsibility will insure correct installation and optimum performance. This means an ever better dealer-to-consumer



*COORDINATION, the secret of Mueller's success, is exemplified in this photo showing Engineer Ed Hill in conference with Executive Vice President Frank Nunlist.*

relationship and salesman-to-dealer relationship. And, these factors add even further to the integrity — and sellability — of Mueller Climatrol as a first line manufacturer.

## ry plant operation

unit performance. Complete ready-to-ship units are picked at random from the shipping docks or out of our warehouse. These are delivered to the laboratories where first a set of preliminary checks are made. This includes complete inventorying of all parts in the package, from bolts and nuts on up. This inventory is checked against a master list to be sure it is a complete unit.

#### Areas of check study

With these preliminary procedures finished, the unit is installed in the laboratory but under actual operating conditions, and is given a total performance check. This includes combustion, blower and motor performance, control functions, and control operation checks.

Every component and part, both company manufactured and that of suppliers, is sent through a complete and pre-planned



*FULL SCALE LABORATORY CHECKS are made on all products, picked at random from the shipping department. This "super-check" on quality is just one of the functions of the department, which plays a part in every step from original idea to the final installation of each product, manufactured by the company, at the customer's site.*

# Quality starts in the press room

**careful control of all stages of manufacture, and development of production economies, wed quality with economical cost in Mueller Climatrol's press room**



FABRICATING OPERATIONS at Mueller firmly refute that old saw that there are no "short cuts to top quality". In fact, we know that without short cuts, top quality manufacture could well result in products priced out of the market.

So, in building and retaining the Mueller name as a synonym for top quality — while keeping our pricing competitive—we feel that planned economies in our fabrication operations have been one of the prime reasons for our growth.

The proper "short cuts", as we see them, are those planned economies that encompass the responsibilities of both design engineering and fabrication. These include such manufacturing formulae and systems as will utilize to the fullest our raw materials, eliminating the highly unprofitable scrap pile. Secondly, design and engineering dovetail their work with our fabricating facilities and available methods. This is done in development of products, and placement of components, so that we can minimize the man-hours per manufactured part.

## Examples of plant engineering

Two examples should show clearly how we do include such manufacturing formulae and systems of T-slotted beds with mounted leader pins for our piercing presses. These, with specially designed die holders (developed by our sheet metal superintendent), allow us to do multiple hole piercing with a number of advantages over the former existing methods. Closer piercing as well as a greater variation in hole placement is now possible. So satisfactory was this plant development, incidentally, that one tool and die manufacturer, seeing the system in operation in our plant, copied it and is now preparing to offer it commercially.

The top and bottom of our heat exchanger are excellent examples of material-saving through design. These two parts are the center circles blanked out during the draw forming of our radiators.

This full utilization of steel is carried out throughout our designing whenever gauges of metal permit. Use of this

Two factors aid us greatly in our "planned economy" in the shearing and fabricating operations. First, we have a wide variety of shapes and sizes due to a full line of models on all types of our heating and air cooling equipment. Secondly, short runs, such as we do, allow for changes which level out the number of specific parts made from the flat sheet.



**Robert Johnson**

*by Robert Johnson* • MANAGER OF PRODUCTION ENGINEERING

"economy through design" is carried forward by the men on the pattern table who, following the suggestions of engineering, take the various sizes of patterns and group them for shearing so that the amount of "drop off" is held to a minimum.

It is this system of short runs which makes our pattern makers as much a part of our fabrication operation as are our press operators. This method of manufacture is the result of our program of "shipping off the shelf" for speedy delivery without a heavy inventory build-up. We have found that short runs for different



**CIRCLES OF STEEL**, purchased in the correct size, are used to form the top and bottom of the combustion chamber for the Mueller line of furnaces.

## FABRICATING

units, rather than the more conventional systems of mass producing one or two models, allow us to keep our capital tied up in steel, rather than in fabricated parts—with the attendant problems of inventory and space.

### Fabricating procedures

In our operation, the pattern sheets and steel supply are scheduled through the various shear procedures. Blanks are then, by means of 4-wheel carts, staged at the various presses and brakes, according to schedules and the presses available.

Through careful planning, we feel we have accomplished top economies in operation by means of sequence operations, and doubling up with compound operations where feasible. This has been materially aided by our plant-engineered tool and die setups, as discussed earlier, which rids us of an overload of lost time in setting up. Otherwise, this would be a high-cost

factor in our particular type of operation.

Our shearing and drawing operations were laid out to provide for absolute minimum of travel. This close positioning allows, in a majority of cases, for a mere repositioning of the carts in order to place them at the next press where needed.

One unique set-up worthy of note is our use of two presses, interlocked on a common bed and with interlocking controls. This set-up allows a single operator to blank, notch and trim simultaneously the two ends of extremely long panels.

### Mueller inspection procedures

The entire fabrication section is departmentalized at our plant, with floor inspectors charged with the responsibility for the work of the various departments and the parts they fabricate. To check fully the set-ups of the various presses, as well as the engineering of each particular model, floor inspectors in cooperation with the re-

sponsible engineer complete an assembly from each new run.

This assembly is then given a series of pre-determined tests to assure that all alignments are in agreement with original specifications and tolerances, and that they fit properly to assure ease in the final assembly operations. A complete set of parts, which make up into the heat exchanger assembly, is mocked up in welding jigs before the entire work order is scheduled for the welding section. The complete assembly is then checked for fit. Metal-to-metal fit is required with a .015 tolerance allowed, to assure a gas tight weld that is structurally strong.

### Heat exchanger and radiator

The particular size of heat exchanger determines the size of unit which is being manufactured, as the area of combustion must be engineered to provide for optimum efficiency in heat output and fuel economy.

## FABRICATION CONTINUED

The radiator, or top mounting to the exchanger, is designed to provide a longer than average flue travel for the heated gases, and low exhaust temperatures. This radiator is of "free floating" design with only one point of contact (the gas connection) with the exchanger.

This "one point of contact" design serves several purposes. Major among these is the minimization of noises resulting from the steel in various parts of the assembly's being subjected to various temperatures. This differential, uncontrolled, can cause unwanted "cracking", and strain on the seams and joints due to variation in expansion and contraction of the steel parts.

### Making up the radiator

The radiator is made up of two duplicate drawn parts. Circles of steel, purchased in the correct size, are fed through a two stage operation where they are drawn in the first press and formed and trimmed on two dies in the second press. In the second operation, the center blanks are obtained for heads and bases on the combustion chamber. The center cutouts plus a single sheared and blanked and rolled sheet, form the chamber itself. A rectangle, blanked out of this sheet to provide the opening for the burner-pouch, is used as the burner-pouch door. These parts are then fed to the adjoining welding section.

### Welding the heat exchanger

The first stage of the welding operation is the continuous seam resistance welding of the two parts of the radiator. These

identical parts are jig-mounted and fed through the vertical welder, which has a potential of 105" of seam welding per minute. The part is then roller-conveyor fed to a manual station where the drum collar is arc welded into place. The inner wrapper sheet which makes the radiator an enclosed chamber is then fitted and locked down by continuous seam welds.

### Stress automatic welding

Company engineers make quite a point of this seam welding procedure on assemblies which will contain the products of combustion. These welding operations can only be done properly in production line operations, with automatic equipment, since it must be air tight to properly function and perform satisfactorily and safely. Even with this automatic welding, each completed assembly is sent through a special testing operation. Here, a seal is placed over the drum collar and the unit is pressure tested under water for the detection of even the most minute leaks.

If a leak is noted, the inspector marks the spot with chalk and returns the sub-assembly to the welders for correction.

### Forming the combustion chamber

Simultaneous with the preceding operation, the combustion chamber proper is being welded. Continuous submerged arc welding, at the rate of 70" per minute, forms the single sheet, previously roll-formed, into a tube. In the next step, on the same installation bank, the head of the chamber is continuously welded into place, in an automatic submerged arc operation.

The facilities are so designed as to allow a single operator to handle both the above operations.



*SHEARING, as a result of careful planning, has been developed so that the result is an absolute minimum of scrap steel.*

The two-piece burner pouch, earlier sub-assembled, is next welded onto the combustion chamber, with positioning gained by full use of jigs. The combustion chamber and radiator are then assembled with this also done on a special jig to assure alignment.

### Cleaning completed sub-assembly

The final operation is the welding in of the combustion chamber base and the welding on of the various support legs needed for the product being manufactured. The completed assembly is then sent through an extensive cleaning and in-



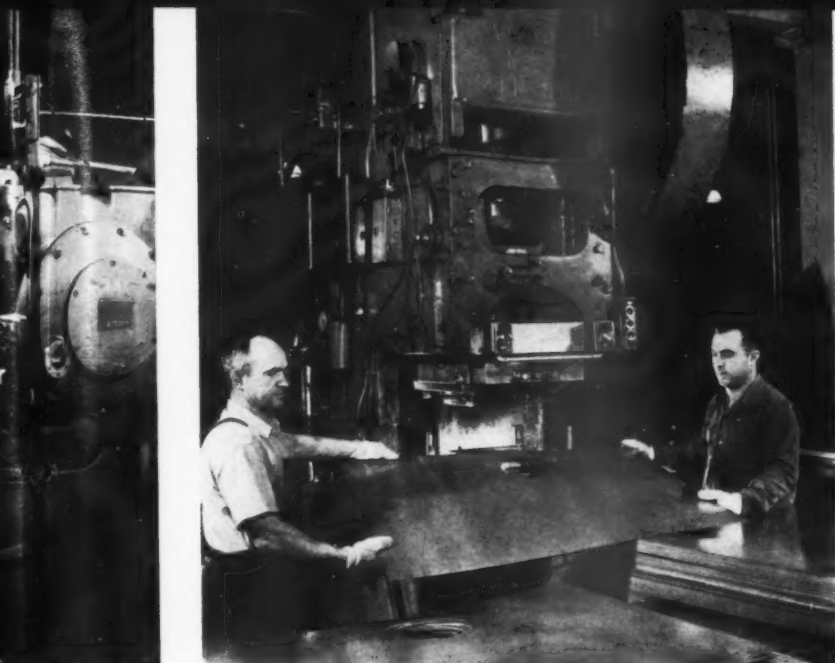
*FIRST FORMING of the combustion chamber is done on this roll former. The pre-stamped part is then routed to the adjacent automatic welding facilities.*



*CONTINUOUS seam welding is done on this machine which operates at the rate of 70" per minute in a continuous submerged arc welding operation as shown in photo.*



*CHAMBER HEAD is continuously welded into place in another submerged arc automatic operation. This, and previous operation, can both be handled by one operator.*



***PRESS OPERATION** is one step in fabrication of the furnace combustion chamber. Here, the correctly sheared-to-size sheet has been fed through the press to blank the gas connection circlet.*



***SHORT RUNS** are standard for many fabricated parts. These are stacked on carts which are used to move pieces to other presses or to the metal cleaning dept.*

spection, and approved assemblies are stamped with the inspector's number before being fed to the final assembly section.

Another fabrication procedure is also tailored for both types of equipment: the blower assembly. In a separate section, the blower housings are made up from 18-19 gauge steel. These housings are made up of a wrapper sheet and two formed end panels. The wrapper is sheared to size. The end panels are blanked and formed while the outer circle is trimmed. The inner circle is punched, and then the venturi is formed on the inner circle edges and the end panel is embossed. These parts then go to the final fabrication station, where they are assembled by a single operator.

#### **Completion of blower**

Fully equipped with a roll former for the wrapper sheet, and a spot welder, he completes the fabrication of the blower housing. Following welding, the housing is painted and assembled with the shaft, wheel, and pulley, and test-run before inspection and delivery as a subassembly to one of the final assembly lines.

Some 70,000 square feet of work area is presently utilized in the Milwaukee operation for the fabrication departments. Equipment on the floor includes shears ranging in size from 5'-20 gauge to 10'- $\frac{1}{4}$ " and press brakes ranging from 20 tons to the 500-ton hydraulic press used in draw forming the radiator parts and the bases for air conditioning units. Some 900 tons of steel are processed each month through this department to provide plant needs.

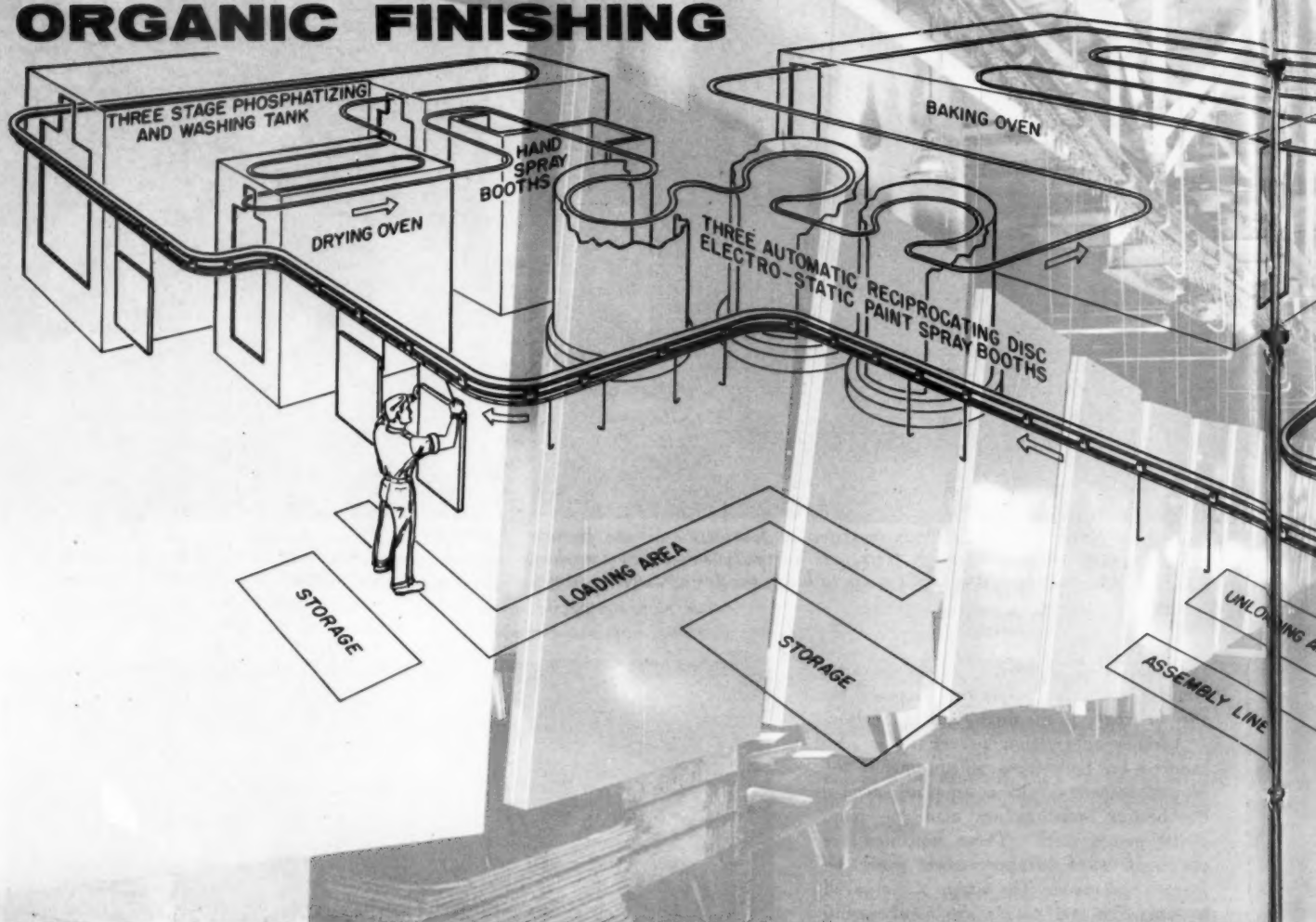
#### **Metal Products Manufacturing**



***MANUAL WELDING** is final step in exchanger assembly. Unit is then sent through a thorough cleaning and inspection, see below. Unit is then given an inspector's stamp of approval, automatically sprayed with rust preventive and routed to assembly.*



## ORGANIC FINISHING



## Mueller Climatrol's new paint set-up is lesson in p

improved product, lower per-unit cost, smooth transition to new completely modern plant, are just part of successes in this phase of plant-wide modernization program



THE IMPORTANCE of complete planning before making a changeover in process and installation of a new system is readily evidenced by the results obtained by Mueller Climatrol in our recent paint department modernization program. Coordination of efforts between engineering, production, and management, combined with the concerted efforts of suppliers, resulted in our now having, we feel, an outstanding installation. It is tailor-made for present production, with plenty of "give" for future expansion. Our new paint operation was put into

production without a minute's lost time. The equipment was working within the hour after we started the line, and has yet to be shut down for repair. The

most important, Plant Engineering's proposal to management which detailed

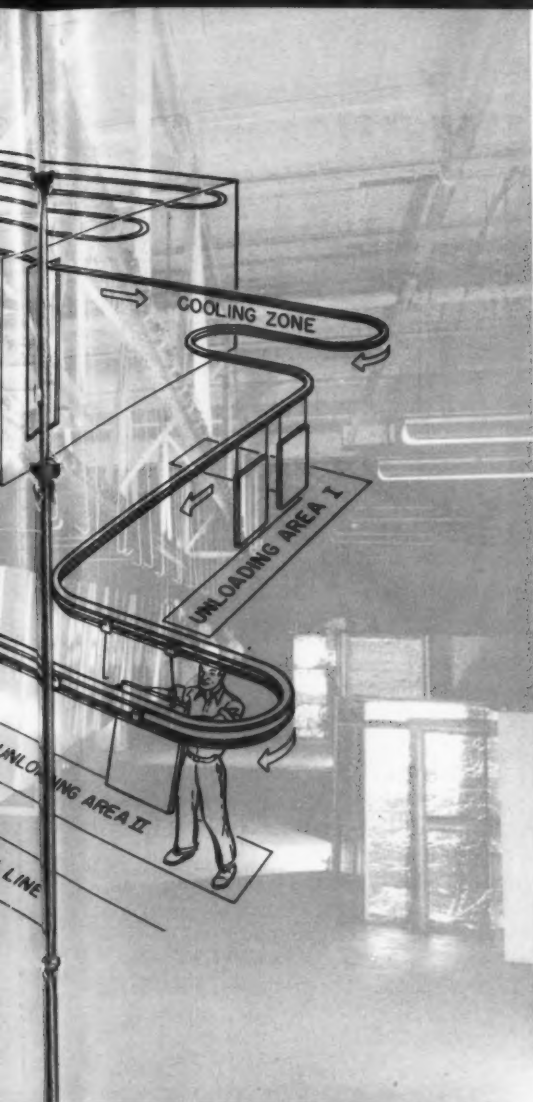
*by Curt Hoerig • MANAGER OF MANUFACTURING*

crew had been so thoroughly briefed on the system, and had such training on their specific duties, that they immediately stepped into their new activities without any apparent loss of efficiency. Our personnel changeover was done in complete harmony, with no employee dissatisfaction or union problems. And

the cost, the proposed increase in production, and per-unit cost reduction, was borne out literally to the penny, and the quality of the product is su-



Curt Hoerig

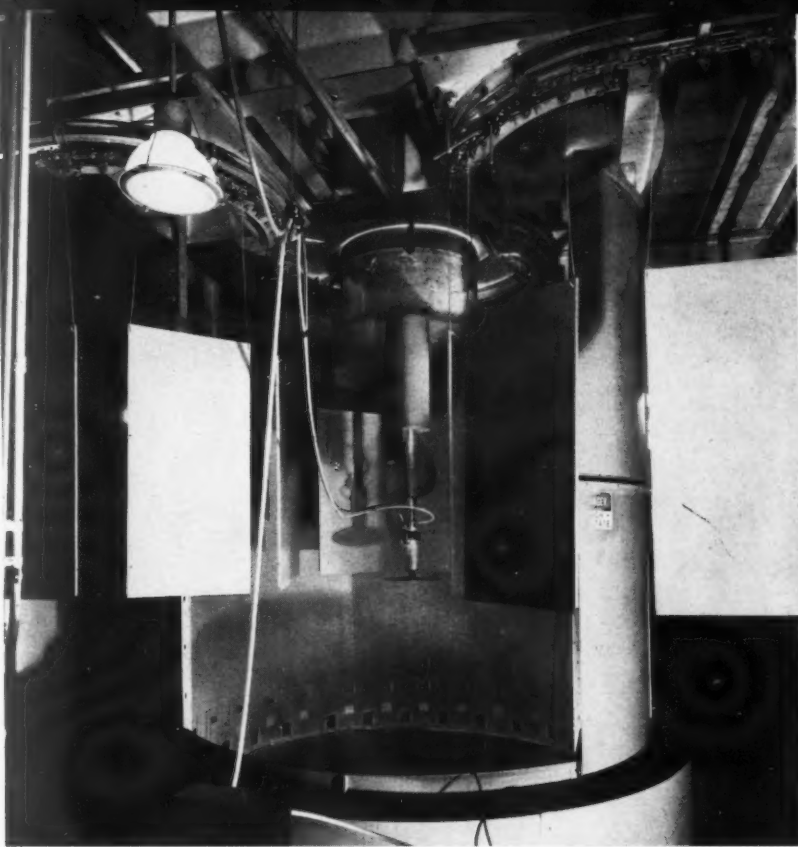


## in preplanning

terior to what we had expected.

All of the painted parts in our full line of furnaces and air conditioners are fabricated and finished under one roof. This means that there are a multitude of different shapes and sizes, as well as a number of different colors, to contend with. Moreover, with the wide range of Mueller's line, and the system of shipping "off the shelf", we do not have any long runs, but rather a constant series of short runs which must dovetail together for top operating economy. Added to this is our continuing increase in total plant output and sales. This situation, happily, seems to be one we shall face for some time into the future.

Prior to our recent modernization, we used a combined system of water wash hand spray booths and dipping operations, and banks of box-type ovens. Our paint section was a bottleneck, and



*ELECTROSTATIC SPRAY paint set-up, one of three in the new installation, is shown here. Completely modernized system has ended bottleneck of former method where more men and more hours were insufficient to handle the required work load.*

even with the section working two shifts, each of 50 hours a week, we had a hard time keeping up with production. It was this condition which we set out to remedy.

There might be some interest in our employee-union program which was carried out as an initial action in our planning, and which carried on throughout the changeover. At the outset, management and plant men met with union officials where an explanation of the plans was given, as well as reasons why such a move was necessary. Moreover, we detailed fully the changes in personnel requirements. Progress reports were also prepared, intermittently, and discussed with the personnel of the paint department.

### Training of employees

We immediately began training the men whom we believed would readily adapt to the new system. During the same period we held up hiring new or replacement personnel for a period of several weeks in other sections of the plant so that we had a number of jobs open. Then when the changeover came,

and the new installation was ready to go, we again discussed with the union, men who were to stay in the paint set-up, and what we had to offer to the balance. This settled, the new jobs were offered to the displaced men. Most immediately accepted, but a few who wanted to stay in painting chose to go elsewhere for employment.

*PHOSPHATIZING is done in this unit. Parts are fed via monorail through the system. Same monorail continues on, carrying parts through to paint application section.*





*NEW INSTALLATION, a general view, is shown above. To be seen in the photo are the three electrostatic spray booths, the reinforcing booths and the unloading section. In inset, worker is applying sheets of aluminum surfaced glass fiber blankets to the interior of the panels which will make up into furnace casings. This is done at end of line.*

#### ORGANIC FINISHING CONTINUED

While these activities were going on, our paint suppliers were running tests on our fabricated parts in the electrostatic spraying laboratories, developing the correct formulations for the required colors, using the new system.

#### Planning for the installation

For the actual installation itself, an on-paper schedule was developed with the work broken down into four categories: plumbing, electrical, iron and sheet metal work, and masonry. A timetable was set up and bids taken from local contractors. Then the actual work began, with programming coordinated with the various crews to keep all working at the same time, yet out of each other's work areas, and with the least interference with production which proceeded on the old equipment. The result, ably carried out by our plant engineer in coordination with the finishing department foreman, was a masterpiece of timing.

These are just some of the problems and staging operations which were part of the development of our new painting plant. We now have an eighty-

eight foot, three-stage cleaning and phosphatizing machine that can handle pieces up to 72" x 26" x 48". Our dry-off oven is gas fired, operating at 200°F, with three passes providing the necessary three-minute drying time. Our application system consists of two staggered reinforcing booths, with a three-unit electrostatic spray installation. The system is laid out to conform most beneficially in utilization of the existing plant housing.

#### Operation planning of system

In the operation, parts from the fabrication section are delivered to our staging area on four-wheeled trucks moved in trains via motorized fork truck from the adjacent fabricating department.

I'd like to point out here that this is a typical example of our engineers' pre-planning for the new installation. When the system was developed and we were planning the installation, our people selected the different parts that we were going to process through the new facilities. Then, in a typical set-up, the hole positioning was studied. We actually welded up a short conveyor line, and hung parts to see how we could relocate our holes to best fit both conveyor and assembly requirements. A little readjustment on holes and changing positioning of others solved this problem before we were faced with it in production.

Parts for finishing as received from the fabrication department are hung on the 1300-foot long conveyor. The chain

feeds into the U-shaped washer which has the second and third stages side by side. This particular type of installation has two special advantages. First, it reduces the space needed, and secondly, it reduces solution heat loss. All tanks are natural gas-fired into submerged tubes. We have found that, due to the present positioning, the burner on the second tank shuts off after a brief start up. Even the third stage burner cuts off most of the time with both the second and third stages still retaining proper temperature, the result of the heat carried forward by the work.

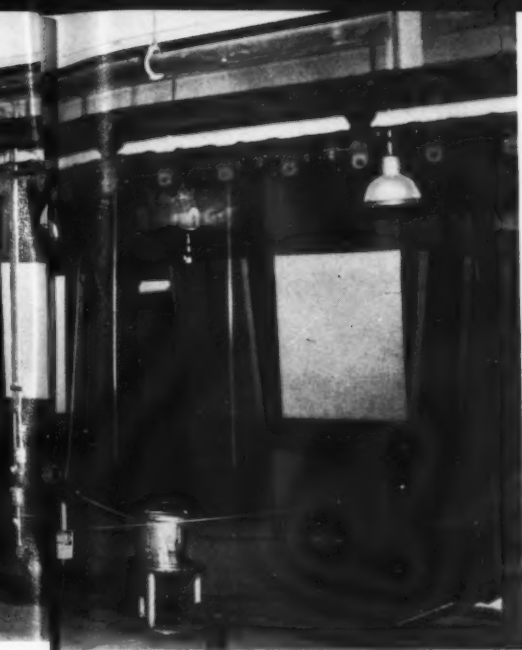
#### Cleaning operations at plant

The first stage spray cleans and phosphatizes in a 3500 gallon tank with solution temperature at 170°F. The second stage is a 1260 gallon clear water spray rinse tank heated to 145°, and the third stage is a chromic acid spray rinse with the 1260 gallon tank heated to 125° and thermostatically controlled.

Our average production runs at two tons of sheet steel per hour. That's roughly about 5,000 square feet of surface cleaning. Cleaned parts travel through the dry-off oven for 3 minutes at 200°F.: and thru an open cooling area for 6 minutes more.

Parts then proceed directly through our reinforcing booths for hand touch-up prior to electrostatic spraying. It is interesting to note that, while we had expected to use these booths a great deal, we actually are using them on less than 1% of the jobs.

I cannot overestimate the satisfaction



we have obtained from our electrostatic spraying operation. Our original intent was to use this type installation only for outside casing panel finishing. But somewhere along the line, during our preliminary tests in the laboratories, it became apparent that it also would be advantageous to run the aluminum coated inner panels and black bases which we previously had been dipping. It was obvious from the start that, while paint savings on these parts would be of no consequence, all handling labor would be, and is, eliminated.

In our new electrostatic setup we have three separate stations. The first is for coating the back side of the parts; the second and third are for finishing the outer side in a base coat and cover coat operation. We use a metalescent paint and want a slight hammer finish. The two passes on the outer side give us uniformity of pattern and a beautiful, even texture that we never were able to achieve with hand spraying.

#### Quick change-over for colors

Since we do program short runs of different colors, there is naturally the problem of color change-over to fit production orders. We have timed our change-overs from one color to another at a little over 180 seconds, with the average standing at about five minutes, from stop to start. The change-over is just a matter of forcing thinner through the spinner head, a wipe off, and a hook up to the new paint source.

There were several reasons for placement of our oven on ground level just outdoors alongside the finishing department. We had seriously considered the

**Metal Products Manufacturing**

suggestion of a roof installation, but aside from the weight factor, the degree of incline needed on the conveyor to go up and to return was about 20°. Keeping the oven at ground level we managed to keep the inclines at a 6° maximum, providing 20% more chain capacity by allowing us closer hanging, and resulting in greater paint economy.

#### Paint baking procedures

In our baking operation, ware travels along some 300 feet of conveyor inside the oven, making five passes at 310°F for a 20 minute bake. The ware is then air cooled as it moves to the unloading station adjacent to the assembly department. While still hanging, a number of functions are carried out which eliminates the need for extra handling. This includes such operations as installation of door handles, wiring diagrams and decals. The panels are then placed on a short laydown production line where they are equipped with aluminum-covered glass-fiber insulation.

This sub-assembly completed, the

parts are either stored at the end of the line, which is directly adjacent to the main assembly line, or trucked to the other assembly lines in the plant, according to production requirements.

#### Summary of achievements

How good is our new paint setup? The result of all this effort is best explained by noting that we now run all production on one shift, while the second shift is open, ready for future expansion. As for production savings, paint mileage has increased over 40% on the outside finish. Four hundred sets of furnace casings, which formerly took two hundred man-hours to clean and spray, now requires only 60 hours. Replacing the 24 men, averaging 50 hours a week, with 10 men who average 40 hours, we have reduced labor requirements from 1200 hours to 400 hours per week, a 66-2/3% saving.

And every part (re-works are now almost non-existent) has a uniformity of finish that is in keeping with our requirement standards.

*CONTROLS FOR BAKE OVEN, shown at right, are located on a central panel. There, close control of all phases of the system is obtained. The panel has temperature controls as well as heat recording equipment, plus the blower and exhaust controls. Below is shown a section of drier where cleaned parts are thoroughly dried before being fed on into the electrostatic spray paint application system. The monorail system has been set for a chain speed of 15 fpm.*



# Interchangeability is key to successful assembly operations

sub-assemblies designed to fit variety of models  
allow final assembly to keep up with the orders



THE STORY OF ASSEMBLY operations at Mueller Climatrol really begins 'way back in Engineering. This holds true for a great many manufacturing operations, but we feel that we have streamlined the coordination between departments to the fullest efficiency—an efficiency necessary for the proper management and production in such a complex operation as ours.

Some 218 models of furnaces and summer air conditioning equipment are produced by our company. This "complete line to fit every need" requires extremely careful production management to achieve two prime



*by Don Nerburn • PRODUCTION CONTROL MANAGER*

purposes: (1) immediate delivery and (2) elimination of large warehouse stores of completed products.

## System well engineered

Engineering has played a big part in simplifying the duties of the Hot Assembly (the furnace) lines and the Cold Assembly (summer air conditioner) lines. A great number of our products are designed so that the basic sub-assemblies are interchangeable, and, engineering-wise, retain the specified operating characteristics for each product. We have been following this basic plan from the early stages in the development of our products and the expansions of our lines.

How well the program of interchangeability has worked out is best expressed by noting that one standard blower assembly, our 11" model, fits into 13 different furnaces and 4 different summer air conditioner models. Other major sub-assemblies are likewise interchangeable. With this program, we are able to provide economies in manufacture that prove very satisfactory in our "cost of manufacture" picture.

This system, which materially reduces our need for tools and dies, as well as simplifying fabrication flow, has an added and important value in that the uniformity of appearance gives our line of "hot and cold" products a definite and recognizable individuality. A furnace can later be equipped with a summer air conditioning unit, and the two units, standing side by side, appear as a singly-designed installation, rather than two dissimilar (and unsatisfactory in appearance) products in one installation.

These are only highlights to show how Engineering plays a great part in our assembly operations. I would like to further detail some of the sub-assembly operations that go into our casings. Every line of products is designed to best fit the desires and needs of our customers, based on a thorough study of the market and consumer tastes. Studies are made both by our design engineers and by nationally known industrial designers, such as Brooks Stevens.

Color also plays a great part and the decision to hold to our major color of forest green was arrived at in this manner.



GENERAL VIEW OF THE FURNACE ASSEMBLY LINE

The special gold finish, being used on our 1957 major line, is the result of a study to find (1st), reaction to the use of color, and gold, specifically (to give a signal presentation announcing our 100th birthday) and, (2nd), the best shade of gold for acceptance.

In one sub-assembly, blankets of glass fiber covered with a highly reflective aluminum foil are supplied in prefabricated shape. These die-cut pieces are engineered to completely cover the interior surface, leaving open only those areas that are required for the operation of the unit.

## Mounting of insulation

The entire inner panel is covered with a special adhesive and the insulation blankets mounted into place. It might be interesting to note the results of this particular operation in sub-assembly. First, the glass fiber blanket serves as a sound barrier, deadening the sound of the inner operations so that no noise will be apparent when customers place units in operation at their final location.

Moreover, the glass fiber, faced with this highly reflective aluminum sheet, serves as a heat barrier which keeps the exterior cool, while at the same time reflecting the heat back into the interior, providing more economical operation.



Y LINE IN MILWAUKEE PLANT. IN BACKGROUND IS THE START OF THE PACKAGING LINE WITH MAN HOLDING CONTAINER ALOFT.

This exterior sub-assembly line of the casing panels results in parts arriving at the final assembly lines ready for a simple gathering and fastening in the final stages.

Our most conventional final assembly program is on our air conditioner lines, but here, too, you will find that we have sub-assembled into major packages a greater part of each air conditioner unit.

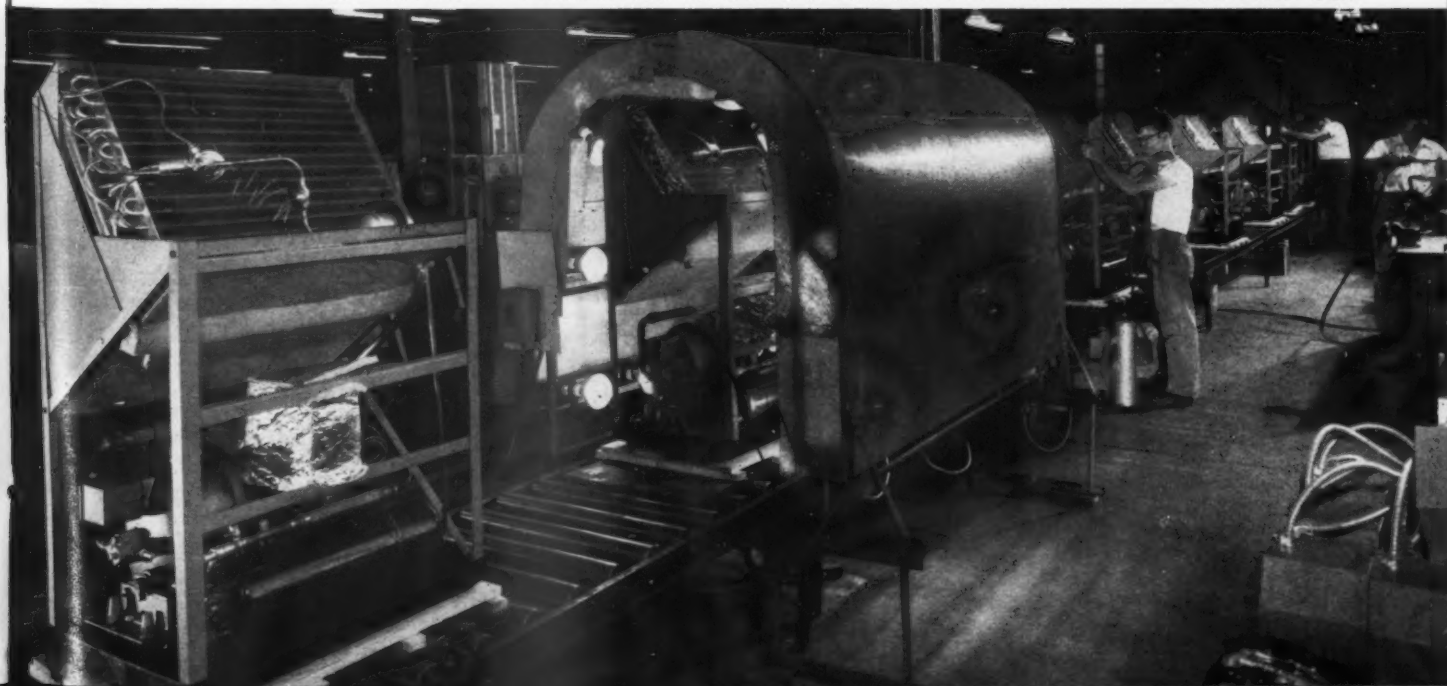
In the final assembly operations of the furnace there are a variety of methods, dependent upon the type of product being produced. There are four different methods of assembly — and packaging — which are standard to the Mueller operation.

In the first case, the unit is shipped knocked down, with special packages for the casing, the heat exchanger, the fan as-

sembly, and the controls. This is used on units for large homes and for commercial applications.

The second method is complete assembly of the heat exchanger and casing with the fan assembly and its casing, and the controls are shipped separately. This method is also dictated by space limitations and handling during installation. to Page 20 →

GENERAL VIEW OF ONE AIR CONDITIONER ASSEMBLY LINE. AT CENTER IS INFRARED OVEN WHERE SYSTEMS ARE BAKED OUT.



# PACKAGING



## Creating "custom-built" units . . .

utilizing Mueller's well engineered "interchangeability" system, the packaging line allows individual treatment of customers' orders on mass production basis



Carl Quick



WE FEEL THAT OUR SYSTEM of packaging expresses most clearly our contention that every unit which is installed by Mueller Climatrol dealers is, in a sense, a custom-made product designed and equipped to fit the particular needs of each individual customer.

The ability to maintain a complete line of products, which will fit every need facing a contractor in every type of construction, is achieved, first, through engineering and manufacturing and, finally, through our system of packaging and shipment.

At first glance, the system would seem to have the possibility of high error in order filling. From performance records, we know that our system is actually a simple one. Moreover, the system has given additional aid to the dealer in his warehousing and to the installer at the site of installation.

*by C. B. Quick* • GENERAL SUPERINTENDENT

The success of our packaging operation—and the resulting "custom-built" installation for our customers—starts back with the dealer's order. His ordering requirements, including the customer's specifica-



requirements of the three home owners.

Order variations may include, (1) fuel selection according to customer requirements, (2) blower size according to air flow requirements, and (3) controls, both for the particular needs of the local installation codes, and the customer's personal wishes. A part of that 3-home installation's being satisfactory to each of the three individual home owners rests firmly with our packaging department.

#### Types of packages used

The following is a brief breakdown of the various types of packages we use. For the greater majority of our units, we use the patented cleated corrugated boxes. These simple-to-assemble types of packages allow for great economies in our major packaging operations. An example of this phase of our packaging would best be

expressed by going through each step in its sequence.

#### Simple packaging procedures

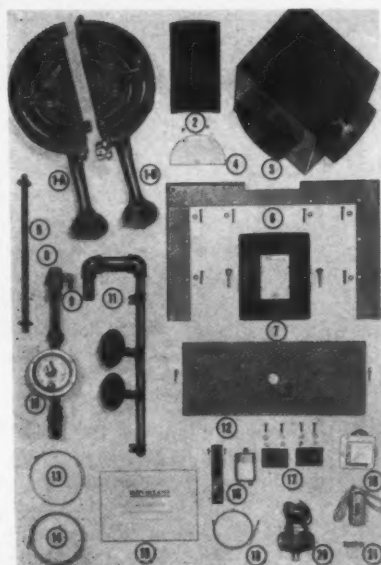
As the assembled unit leaves the assembly line, the inspector inserts an envelope containing the Mueller Climatrol Warranty, wiring diagrams, installation data, plus maintenance and engineering information which will be of aid to the dealer and installer.

The unit, which was assembled onto the container base, has the four-sided container matt slipped over it, and after the top is put into place, a simple nailing completes the packaging operation.

Similar packages are used for the other units which are shipped in wooden crates, or in the cleated plywood containers used for our larger models. Blowers, components, and return air ducts are shipped in corrugated containers.

Ed. note: The four different methods of shipment were explained in the report on assembly methods, since the understanding of the assembly system was best expressed by the author of that report by breaking down the four types of shipments with their resultant packages.

Four different types of printed forms and several types of printed adhesive tapes



CONTROLS AND TRIM  
516-150 114-150 116-130  
524-150 115-150 116-150  
124-150

514-150 CONVERSION PACKAGE

GAS: NAT. MIXED MFG. LPG

Our Order No. \_\_\_\_\_

Customer's Order or Tag No. \_\_\_\_\_

THIS CARTON CONTAINS:

Item	Description	✓
1	C. I. Burner, with Pilot Burner and Breed Fitting	
2	Burner Patch Door	
3	Draft Diverter	
4	Burner Patch Trim	
5	Flue Outlet Baffle	
6	Rolling Plate	
7	Gas Valve	
8	Gas Pressure Regulator, with Breed Fitting	
9	Seals	
10	Gas Cock	
11	Pilot Cock	
12	Burner Support Bracket	
13	Staples	
14	Manifold Assembly, with Brass Orifices and Air Shutter	
15	Thermocouple Lead	
16	Breed Valve	
17	Set of Instructions	
18	Thermostat and Wire Cable	
19	Transformer	
20	Pilot Tube	
21	Pilot Shield	
22	Extra Orifices (not shown)	

MPM photo

tions, are set down in an order form which details exactly what product is being installed, and the needs for the particular shipment. This order is then readied.

#### One value of system

To point out the importance of that original order, it would be wise to note that we have shipped three basically identical furnace units to the same dealer for installation in homes, each of different size and construction, in the same block. Each of these particular orders called for identical outer casings and heat exchangers. But, through our customer engineering, these basic systems were so equipped that they each handled the individual

Metal Products Manufacturing



*VISUAL INVENTORY FORM, shown at left, is just one of the many developed by Packaging Engineers at Mueller to provide adequate insurance for proper and accurate shipping. Below, working from the internal check sheet, the final inspector inks in the customer's order number to provide ready identification upon delivery.*



## .. with packaging know-how

### PACKAGING CONTINUED

are the basic tools in our packaging operation, which puts the "proof of the pudding" in our claim of custom-made installations for every need. These forms are (1) visual inventory sheets, (2) customer order forms, (3) internal check sheets, and (4) adhesive type-of-fuel stickers.

The visual inventory form shown pictorially on the previous page is made up separately for each different series of models which we produce. These forms show each individual part, which is also listed by part order number on the other half of the sheet.

#### Customer order forms

The customer order forms are designed to fit our packaging system and contain material needed for the installation as noted by the dealer. The order, verified by close checking against requirements for the particular needs of the customer, is copied by the billing department into the form and sent to the packaging and shipping department.

The internal check sheet is a duplication of the information contained in the visual inventory sheet, but contains only the part's number and name. This internal sheet, the final check on the line, is included in the box with the order, while

the external visual inventory form is later pasted to the side of the shipping box before shipping. This external sheet is printed on three colors of paper; blue for gas, pink for oil, and yellow for blower assemblies.

The adhesive "type-of-fuel" stickers further declare the contents of the box by showing the type of gas or the type of oil.

As the box goes down the conveyor line, stock selectors fill the order according to the internal sheet specifications. In the next step, an inspector, working from the internal sheet, inventories the components and accessories, to assure the box being correctly filled. Small accessories, such as screws, attachments and small fittings, are packaged in polyethylene bags for quick visual identification. Larger fittings are placed in the container surrounded by shredded paper.

#### Final package check

As a final check, the packager again inventories the contents of the box, checking off each item on the sheet. When the visual inventory sheet completely lists the contents of the box, it is checked against the internal sheet, which is then returned to the box. The visual inventory sheet is then glued to the box side. At the same time, the adhesive stickers are affixed next to the visual inventory sheet, to provide posi-

tive identification for the contents. The container is then taped or stapled depending upon total weight, and is shipped to the ordering dealer.

#### Stockpiling smooths operation

We also fill, and put into inventory, boxes according to anticipated orders, and use these from our inventory to fill future orders. This system of combining packaging for dealers' orders with inventory packages allows us to operate our crew full time, without the need for additional workers during overload periods, due to the cushion of previously filled packages.

The additional value of this container equipped with our visual inventory sheet is reflected at the point of installation. I would like to point out that there are three areas of efficiency at the dealer level which provide even more reason for our pictorial presentation of components and box contents. First, in the dealers' warehouse facilities, the color provides for quick identification. Secondly, the listing contains the dealer's own order number, enabling him to immediately identify the package he needs for a particular installation. Thirdly, this visual picture allows him to compare and, in emergencies, "rob" the box of parts which he may need for a replacement or repair. With the visual inventory sheet, which contains both

#### NUNLIST CONTINUED

results, obtained from personal evaluation and job analysis programs.

In this area of people, however, we again must pause to take regular inventory. Over 100 years we have built up an organizational structure—which in the last analysis means people—which has served to bring us to our present level of achievement. Like an old house, however, this structure must be maintained and modernized.

No matter what degree of automation we achieve, no matter what miracles in electronics, in chemistry, in metallurgy, in air conditioning, people are still the life blood of America. We as an organization can only step forward and modernize ourselves as our people do.

*We have great contempt for contentment.* Perfection will never be achieved in our time and we think this particularly true in the area of human relations.

For example, we at Mueller Climatrol are proud of our sales force and what they have achieved. Viewing their current sales, in relationship to past sales records, they are making great progress, but an honest appraisal must recognize that our actual sales are limited only by limitations on the vision and the imagination of our company and in fact, of our entire industry.

We do not view sales as another mark on a punch card, nor another piece of steel that must be sheared. Each sale to us means that another member of our entire society has been educated to understand and appreciate the need for better living conditions, better health and better comfort for himself and his family. Each sale is another step upward to a better way of American life. In your own comfortable homes, summer and winter, it is hard to believe the figures which reveal that by far and away the greater number of American homes are still inadequately heated and only the merest decimal of the population enjoys summer comfort, even in our tropical climates. Much of our population still looks upon summer air conditioning as a decided luxury. Yet, we know that summer comfort will become and in fact, is now becoming as great a necessity as heat for your home, your office building and your factories.

The understanding of summer comfort as a necessity, just as winter comfort is a necessity, will only come with education. That education starts in schools of the market place with properly trained personnel from Mueller Climatrol and from all other progressive companies in our industry, serving as teachers. How much training — *rock hard work and training* — is needed to catch up with our industry to say nothing of getting ahead of the

public, so that we can begin collective action as an industry to educate the consumers! ! It is necessary that the real value of our products in terms of their better standards of living be brought home to the public in unmistakable terms.

We are moving into a more gracious way of life, but we are also moving into a more complex way of life. We will not need as much labor as we need today. We will need more technicians. In selling, we will not need, nor tolerate, order takers. We will need well informed sales technicians, people who have been chosen for their particular competency, people who have paralleled their technological education with the development of an understanding of the idiosyncrasies that are part of each and everyone of us as consumers.

Over a hundred years of life our company has developed for itself a distinctive personality, compounded of experience and training, desire and enthusiasm. It is a personality of honesty and integrity, fair dealing and loyalty. All of our people must radiate the prototype personality of our organization if we are to be recognized properly in the market place.

We are on the threshold of a golden age. We have great pride in our company and what the Mueller Climatrol name stands for, but we are not content — we are never satisfied. We are not just a hundred years old aging company. We are part of the new economy. We have completed our hundred years of apprenticeship and are now mature and ready for the demands that will be made on our corporate imagination, flexibility and initiative in the period ahead.

Our whole structure, physical plant, research and development techniques, personnel analysis, capital use, are consistently undergoing a regenerative process, which keeps us alive and dynamic. Old companies, like old people, sometimes live in their memories, while youth lives in hope for the future.

We are attempting to pool our collective intelligence to guide, to instruct, to improve, to develop Mueller Climatrol. We are not preparing for a battle. We have been in the battle of progress and the war of competition for a long time and we have won more of our share of skirmishes. We are preparing to wage and win a peaceful development that will provide peace of mind and health of body for all the people during the golden age of economic development. We are endeavoring to guarantee Mueller Climatrol's role of leadership in the Tomorrow Land of our industry, secure in a vastly improved world — improved spiritually, physically and morally — ready for the comfort that the progress of man is preparing for us.

a picture of the product and the manufacturer's part number, he gains double assurance of obtaining the correct repair part. At the place of installation, the package allows the installer to see, and be sure of, each unit he is handling. This speed-up in identification is gained by the visual picture and the listing on the external inventory, which is combined with the installation manual, (shipped in the fire box pouch of the main casing, and installed during assembly) to provide the installer with immediate recognition and knowledge of the contents.

#### Benefits of system

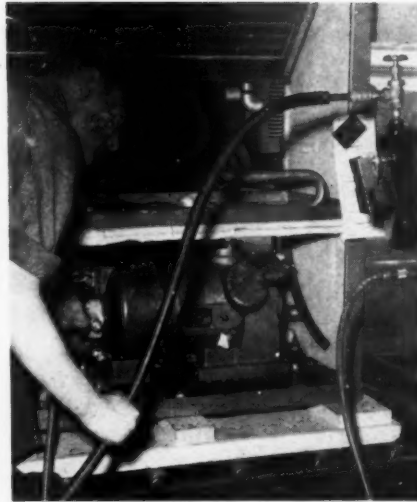
This system provides us with assurance of properly filled, and correctly shipped, orders. This "peace of mind" arrives at the management level in the form of (1) customer satisfaction, and (2) elimination of incorrectly filled orders. It provides the dealer with (1) a visual expression of our efforts to aid him in his work, and (2) simplification of his warehousing and storage operations. For the installer, it serves as a silent installation assistant, providing him with greater knowledge when used in conjunction with the manual and his previous experience. And for all three, it is a constant reminder of the quality of our components through the visual identification with nationally known component brands, and an understanding of all the parts that go into our products: a tangential method of dealer and installer education.



**EXCHANGER ASSEMBLY** is lowered into partially completed cabinet in one of the initial steps in final assembly of furnace.



**EARLIER, BLOWER ASSEMBLIES** were made up in a special sub-assembly line which supplies pre-tested complete blowers.



**AIRCONDITIONING ASSEMBLY** is an alternate series of assembly and inspection so that the control of quality is maintained.

MPM photos

#### ASSEMBLY CONTINUED

The third and most common method consists of the complete furnace assembly, less the burner and controls, which are shipped in a separate package to meet special local requirements. In the case of unit heaters, the basic unit is completely assembled excepting the controls and manifolds. This assembly is packaged with one side of the crate left unfastened and sent to the warehouse. Then, at time of shipment, according to the particular specifications of the customer's order, the correct manifold and control is fitted into the unfastened side of the container. This done, the crate is securely nailed and the product is shipped as a complete unit. This method of assembly allows for great latitude in filling orders, resulting in simplification of our warehouse operation and reduction of inventory.

#### Also ship "completed units"

The fourth method is the completely assembled unit, shipped as a single package, which is ready for installation on arrival without additional on-the-site assembly.

In a typical assembly operation, these procedures are followed. First, on the floor level roller conveyor line, a plywood pallet is placed to serve as a carrier for the unit during the processes of final assembly. Then the container base is laid down and the unit is built directly upon this. Panels, previously ordered from the adjoining storage area, are built up into the outer casing in the scheduled size.

As this progresses, one operation, by means of an electric hoist and monorail system, picks up, lifts, and lowers a completely fabricated heat exchanger into position. This is bolted into place using the brackets previously installed in the sub-assembly of the unit, as reported in our story on fabrication. Then the firebox door



**BLOWER MOTOR** is then installed. After being bolted into place, the fan belt is positioned and blower system checked again.

is put into place, as well as any ornamentation not installed during sub-assembly.

As the unit rolls down the conveyor line, it is halted at stations where (1) the proper size motor is installed, (2) the blower is installed and bolted into place, (3) the belt is hooked up to the motor, (4) correct alignment is made, and (5) the final front lower panel is fitted into place. The unit is then fed on to the adjoining packaging line.

#### Example of versatility

One assembly, completed on the final assembly line, could, according to a specific customer's order, be installed as either a natural gas-fired unit, an oil-fired unit, an LP gas-fired unit, or a unit using any of the mixed gases found in certain areas. The installation would also completely conform to local codes and conditions. This flexibility is accomplished

by shipment of all controls and burner parts in separate packages. These packages, made up in another department, provide the answer to immediate delivery on a multitude of products without tying up a tremendous amount of space and capital in warehouse inventory.

#### Assembling summer units

The summer air conditioner final assembly operations are more elaborate. Two main final assembly lines, one for water-cooled cycles and one for air-cooled cycles, are supplied with sub-assembled components. Due to the high quality standard that must be maintained, these lines are a series of assembly and inspection operations alternately. Each unit moves along with its own check list to cover three separate pretesting operations, as well as a dehydrating operation in an infrared oven, and the final tests are run under difficult operating conditions.



**COMPLETED FURNACE** receives the familiar name plate of stamped aluminum. Then it is sent on into packaging section.

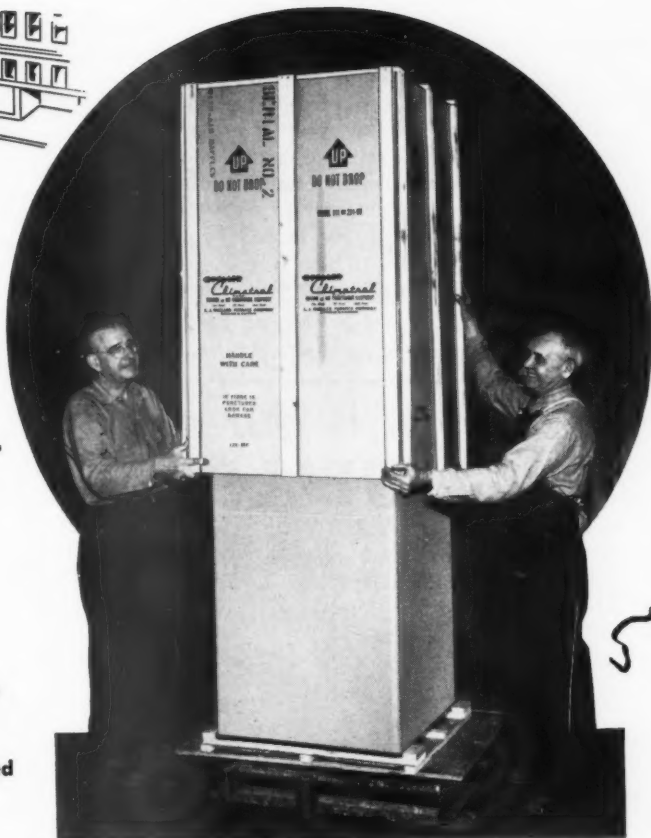


CONTAINERS FOR  
AROUND THE CORNER  
DELIVERY OR..

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MILWAUKEE

*Producers of...*

Watkins Containers  
Wooden Boxes  
Box Shooks  
Crates  
Pallets  
Kieckhefer Paletboxes  
Industrial Lumber  
Special Design Cleated  
Fibre Containers



## DELIVER SAFELY *without a scratch...*

Kieckhefer Box & Lumber Co. is proud to be included among Mueller Climatrol's oldest and most reliable suppliers. Mueller Climatrol can depend upon Kieckhefer-Milwaukee because Kieckhefer-Milwaukee offers over fifty years of practical experience in engineering and building quality containers.

More and more manufacturers of central heating and air conditioning

units are using Watkins type containers such as used by Mueller Climatrol.

If you have a packaging problem call Kieckhefer-Milwaukee. We can provide a container properly designed for your product.

Your product will be delivered safely — economically — around the corner or across the nation.

*Kieckhefer-Milwaukee Containers will meet your Government Specifications*

PACKAGING ENGINEERS  
**KIECKHEFER**  
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FOR FIFTY YEARS

**KIECKHEFER BOX AND LUMBER CO.**

• WOODEN BOXES • BOX SHOOKS • CRATES • CLEATED FIBRE SHIPPING CONTAINERS •

1711 WEST CANAL STREET, MILWAUKEE 3, WIS.

## 26th NATIONAL HOUSEWARES EXHIBIT

### presstime editorial report on opening day

The National Housewares Manufacturers' Association sponsored the 26th National Housewares exhibit at Navy Pier, Chicago, Illinois on Thursday, January 17, through January 24. Thousands of items including the newest housewares on the market were shown.

There were 727 exhibitors occupying 350,000 square feet of space. This represented an increase of 101 exhibitors over the January 1956 exhibit.

At press date for February MPM, opening day for the NHMA exhibit, Mr. Dolph Zapfel, NHMA secretary, had predicted that this would be the biggest show in housewares history. He went on to say, "More than 25,000 members of the booming housewares industry, which has annual retail sales exceeding \$2 billion, will gather in Chicago during the NHMA show. They will include 10,000 leading housewares buyers from all 48 states, Canada, and many foreign countries."

#### Bright outlook

The buyers of housewares and appliances as well as those who manufacture them are optimistic about their 1957 business. The bright outlook and other facts obtained in two nationwide surveys were revealed by directors of the 26th National Housewares Exhibit.

In answers to questionnaires sent to more than 11,000 buyers, 92 per cent of the replies said business would go up in 1957. Of the 727 manufacturers exhibiting at the show, 82 per cent of those who replied predicted the same trend. Returns were received from 39 per cent of the manufacturers and from 10.6 per cent of the buying firms contacted.

Specific answers to questions about their present business and industry trend revealed: The majority of both buyers and manufacturers reported good business in 1956, 94 per cent of the buyers said business in the second half of last year was as good or better than the first half, and 89 per cent of the manufacturers agreed.

Continued uptrend in the industry was confirmed by 90 per cent of the manufacturers who said they are more optimistic about the future than they were six months or a year ago. More than 35 per cent attributed their bright outlook to general business conditions.

#### What about colors for '57

Yellow, turquoise and pink were named in that order by both buyers and

manufacturers as the three housewares colors homemakers will want most this year. The two groups also agreed on the next three most wanted colors: red, white and copper, with manufacturers giving a slight edge to red over white which was named in fourth place by buyers.

#### NHMA officers

Officers and directors of the National Housewares Manufacturers Association

are: president, C. M. McCreery, Revere Copper and Brass, Inc.; vice president, W. E. O'Brien, Toastmaster Products Div., McGraw-Edison; treasurer, C. O. Hamilton, Hamilton Mfg. Corp.; secretary, Dolph Zapfel, NHMA; directors: J. W. Alsdorf, Cory Corp.; E. H. Gorton, Wooster Rubber Co.; S. L. Hanssen, Hanson Scale Co.; J. M. Jayne, The Plas-Tex Corp.; J. A. Kaplan, Joseph A. Kaplan & Sons, Inc.; W. H. Sahloff, General Electric Co.; G. C. Kubitz, Aluminum Goods Mfg. Co.; J. M. Bredfeld, Corning Glass Works; and H. C. Forster, Ecko Products Co.

## It is our pleasure to serve MUELLER CLIMATROL



Install this assembly and forget it — the most economical combination of Regulator and Valve on the market today. By combining these two universally accepted products, the Thermac Appliance Regulator with Thermac's specially heat-treated aluminum alloy gas shut-off valve, an unusually low cost assembly is assured.

The Regulator itself — the Thermac "T" Series, is very simply and ruggedly designed with so few parts it is practically fool-proof. High in capacity — easy to install in cramped and crowded quarters. Easy to service without removal from line. All these features plus universal acceptance by leading appliance builders means that your selection of Thermac will be highly regarded wherever your appliances are sold.

Compare these fine products in any way you choose — performance, quality and price — and you will choose Thermac. Get full information on the above assembly today.



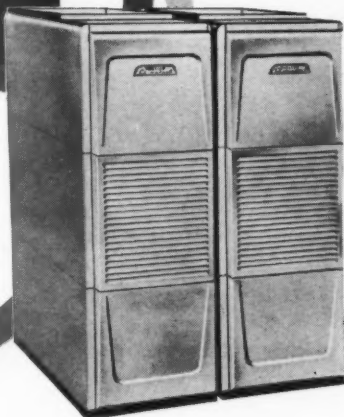
800 East 108th Street • Los Angeles 59, California  
"Over 23 years' experience building gas controls"

# NO REASON WHY YOU CAN'T DO IT, TOO!



Typical of the Mueller Climatrol line is this summer air conditioner and gas-fired winter air conditioner, now uniformly painted electrostatically with RANSBURG NO. 2 PROCESS

## MUELLER CLIMATROL, Milwaukee, increases paint mileage 40% with RANSBURG NO. 2 PROCESS



And, 10 men averaging  
40 hours a week  
now do the work  
formerly handled  
by 24 men  
averaging  
50 hours!

Painting used to be a bottleneck in the manufacture of heating and air conditioning equipment at Mueller Climatrol.

But not any more!

When Mueller modernized its finishing department—replacing hand spray with Ransburg No. 2 Process Electro-Spray—daily production was increased . . . finishing costs were cut . . . and quality of the work was improved.

Annually, Mueller coats over 10 million square feet of sheet metal, so a 40% increase in paint mileage—translated into paint dollars saved—is a sizeable figure. Pointing up other savings, a

typical run of 400 furnace casings used to take 200 man hours to clean and hand spray. Mueller does it now in 60 hours!

### NO REASON WHY YOU CAN'T DO IT, TOO!

Whatever your product, if your production justifies conveyorized painting, chances are one of the Ransburg Electro-Coating Processes can do it better, for less, with improved uniformity and quality of the work. Write for our new brochure which includes numerous examples of both large and small manufacturers of a variety of products who are enjoying the many advantages of Ransburg Electrostatic Spray Painting.

*Ransburg*

ELECTRO-COATING CORP.

Indianapolis 7, Indiana

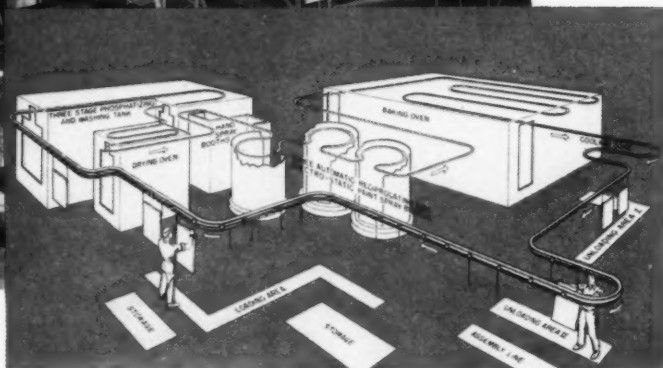
RANSBURG

for Customized Conveyors and Materials Handling Systems  
Engineered for Your Operation—Consult:

## Conveyor Systems, Inc.



A section of a  
4 Mile Overhead  
Trolley System



Conveyor Systems, Inc. Installation at Mueller Climatrol

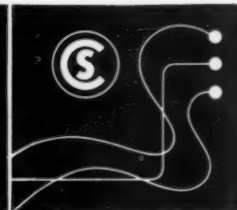
We invite you to make use of our thirty-five years experience as designers, engineers, manufacturers and erectors of Conveyor Systems and Special Machines for materials handling. For increased efficiency at lower costs write a brief description of your needs to Conveyor Systems, Inc.

**TROLLEY • ROLLER • SLAT • CHAIN • BELT • SPECIAL EQUIPMENT**

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# NEWS about Suppliers

## NEW \$2-MILLION PLANT FOR ROBERTSHAW-FULTON

A modern \$2-million manufacturing plant, more than doubling the size and output of the installation it replaces, was officially opened Jan. 3 by the Bridgeport Thermostat Division of Robertshaw-Fulton Controls Co.

The 180,000 sq. ft. plant, on a 15-acre site in Milford, Conn., represents one of the largest manufacturing installations in the area. Complex precision instruments and components for use in industry and jet aircraft are already being produced. In addition, metallic bellows and instruments employing bellows, such as temperature controls for home appliances, and automotive thermostats, also are being made.

Anthony D. Rapuano is vice president of Robertshaw-Fulton and general manager of the Bridgeport Thermostat Division.

## NEW PARKER RUST PROOF PLANT

Parker Rust Proof Company's sixth manufacturing plant is now being built in St. Louis, Mo., and will be in full operation by next June. The new plant is to have an area of 40,000 sq. ft.

In addition to air conditioned office space and locker rooms, the plant will house manufacturing facilities and warehouse space for Parker products for the surface treatment of metals.

"We are building this new plant in St. Louis," announced R. W. Englehart, president of Parker Rust Proof, "so that our customers in that area may have the same service furnished to manufacturers by our plants in Michigan, Ohio, New Jersey, California, and Ontario."

## PEMCO INSTALLS ELECTROSTATIC SPRAYING SYSTEM FOR RESEARCH

Installation of a complete disc atomizing type of electrostatic spraying system for use in the basic development of porcelain enamels has been announced by Pemco Corp., Baltimore, Md. The company has added the Ransburg process and equipment to its facilities, ac-

cording to Dr. George Spencer-Strong, vice president and director of research. The equipment has been in use since the end of October, and gives indication that it will eliminate much of the large

amount of testing and experimentation heretofore necessary in plants of customers who use electrostatic spraying on their production lines. Experimentation and evaluation may now be done at the Pemco research division laboratories.

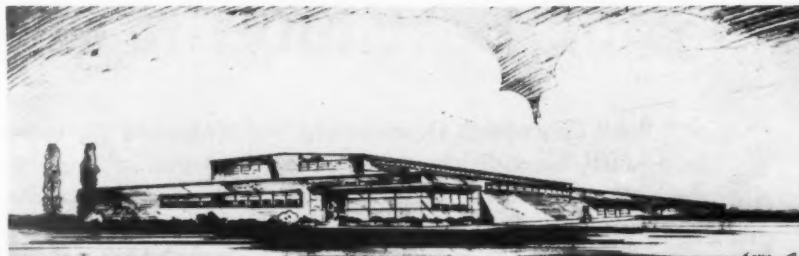
The new system may result in the development of entirely new enamels, stated Strong, in addition to helping customers speed production and cut costs.

## PLATING CO. IN NEW PLANT

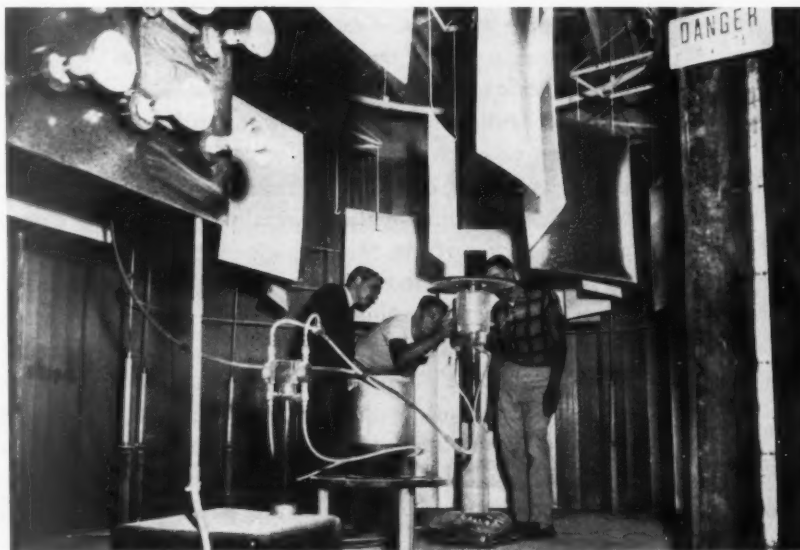
The Fitzgerald Plating Co., Detroit, Mich., has just completed moving into  
to Page 73 →



*New Robertshaw-Fulton plant at Milford, Connecticut.*



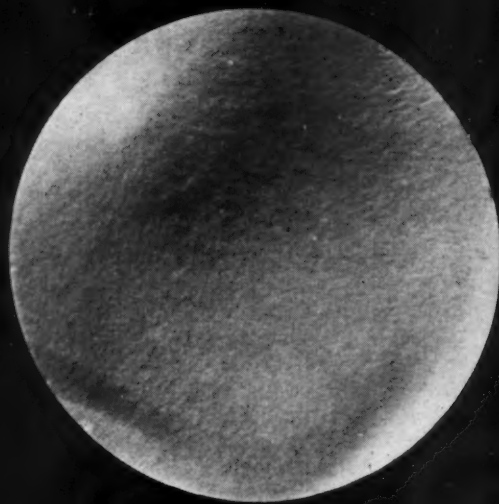
*Parker Rust Proof plant at St. Louis now under construction.*



*Kim Traub, (center), research engineer, and James Devlin, (right), service engineer, both of Pemco, show features of the new electrostatic equipment to visiting Editor Dana Chase.*

This is an unretouched photo of a heavy section of broken Coors High Density Alumina Ceramic, used for grinding balls and brick. It was formed by the unique Isostatic Process. Obviously, this ceramic is completely homogenous — with no voids or air pockets, and without drying stress lines. This homogenous structure can be found in products formed by the Isostatic Process used by Coors.

*Coors*



FOR MAXIMUM GRINDING RESULTS:

## your best buy in grinding balls &

- All Coors High Density Grinding Media and Mill Liner Brick are made by the Isostatic Process which produces these thick sections without voids or air pockets and without internal drying stresses. This means that these Coors products are completely homogenous or uniform in physical structure throughout; also, that they have the same hardness (9 on Moh's Scale) at the center as on the surface. Results: Longer service life in your mill; no chipping or cracking of balls to cause gouging or scratching of the lining; uniform hardness which permits media to retain its shape with smooth surfaces for easy cleaning.

**With the Isostatic Process,** both Coors High Density Grinding Media and Coors High Density Brick are formed initially by pressing a DRY, unfired alumina powder in a rubber mold, under high hydraulic pressure. This uniform pressure from all directions provides uniform compactness and complete homogeneity. Since the powdered

ceramic material is dry before it is formed into the shape of grinding media or brick, these products go directly from the forming press to the high temperature (2670°F) continuous kilns—thus eliminating the ordinary drying step, necessary in all conventional wet processes.

**Before firing,** all ceramic products produced by a wet process must be thoroughly dried, whether they are formed by extruding, casting, hand rolling, etc. Obviously, once a wet process product is formed, the outside dries first. This causes hidden drying stress rings to develop. And finally, the volume occupied by the water is replaced by air—forming hidden voids, as you can plainly see in the fractured piece shown above. Hidden drying stresses cause media to break up in your mill. Voids cause uneven wear of media and brick.

Since Coors High Density Grinding Balls and Mill Lining Brick are dry when they

LZP INDUSTRIAL CERAMICS CO., 275 Kalamath St., Denver 23, Colorado • National Sales Representatives for:



This is an unretouched photo of a heavy section of broken high density alumina ceramic. It was formed by a conventional wet process. This ceramic piece illustrates the voids and stress rings caused by differential drying—i.e., drying from the outside in to the center. These inherent imperfections can cause balls to crack, chip and break in the mill, resulting in abnormal wear of the mill lining.

## mill liner brick is *Coors* because

are formed, they go directly to the high temperature kilns for firing...thus eliminating all stresses and voids.

**Coors also uses** all of the conventional wet processes as well as the ordinary dry-press process for the manufacture of many products which are not subjected to the pounding that mill linings and grinding media must take. But Coors uses only the Isostatic Process to make grinding media and liner brick, so they will withstand severe abrasion, impact shocks and other physical stresses.

**Made of the same,** identical high alumina ceramic which was developed as a grinding ball material...made by the same, identical Isostatic Process...Coors High Density Grinding Media and Mill Liner Brick are companion products. However, because of their uniformity and hardness, Coors Media will give you equally good grinding results, regardless of the lining material used

in your mill. Furthermore, the service life of any lining will be longer when the mill is charged with Coors media.

**If you want** maximum grinding results *plus* maximum service life from your pebble mills, your best buy is Coors High Density Grinding Media and Mill Liner Brick. And when the best costs little, if any more—why settle for less?

COORS PORCELAIN CO.  
c/o LZF Industrial Ceramics Co.  
275 Kalamath St., Denver 23, Colorado



Please send me technical information and samples of Coors Grinding Media.

Name.....

Title.....

Company.....

Address.....

City.....State.....

# COORS PORCELAIN COMPANY GOLDEN, COLORADO

Appliances move easier  
on

## NAGEL-CHASE CASTERS



For dependable, easy, free movement, equip your appliances with free swiveling, sturdy Nagel-Chase Casters, the standard with the leading appliance manufacturers.

Refer any problem of mobility to Nagel-Chase, specialists in production casters.

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### The NAGEL-CHASE MANUFACTURING CO.

2817 North Ashland Avenue, Chicago 13, Ill.

Manufacturers of Nagel-Chase Casters  
and V-Belt Pulleys



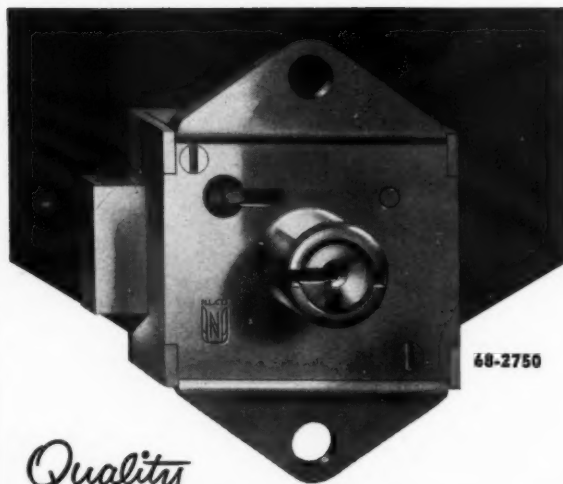
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to Get—  
the RIGHT Data  
the RIGHT Ideas  
about YOUR  
MINIATURE  
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Here's the scientific way to approach Miniature Lighting. Just fill in basic questions on Drake's new PROJECT DATA SHEET, and mail it back. Our expert engineers will scientifically analyze your data . . . from all the thousands of possible lighting arrangements, will recommend the one best for top results, greatest economy, in your specific case. Drake's decades of specialized Miniature Lighting experience, and complete line of regular and special units, are thus at your disposal. This service is free—no obligation.

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**SOCKET & JEWEL LIGHT ASSEMBLIES**



68-2750

*Quality*

## LOCKS

by NATIONAL LOCK

whatever the size,  
shape or "specs"  
you require

Included are functional locks (plate, lever and pin tumbler types) for cabinets, control boxes, lockers, office equipment, a wide variety of appliances and metal products. No. 68-2750 is an all-purpose lever tumbler lock for use on right or left hand doors or drawers.

Surface mounted, it is available with dead bolt or beveled brass spring bolt (No. 68-2600). No. 68-157 is a versatile pin tumbler knob type lock with matching latch and knob. Lock is reversible and can be keyed alike, different, masterkeyed or submasterkeyed.

Let our sales engineers work with you in recommending the lock (standard or special) to best meet your requirements. WRITE FOR OUR NEW LOCK CATALOG 156.

68-157  
LOCK

68-158  
LATCH

68-159  
KNOB



**NATIONAL LOCK COMPANY**

Rockford, Illinois • Industrial Hardware Division



*soft as a kitten on all finishes*  
**but** **tough as a tiger for strong**  
**dependable shipping protection**

\* The Stone Container Corporation has developed this specially coated board for use as interior packing in shipping containers for appliances and paint or enamel finished metal products. Stone-ize corrugated prevents abrasions to delicate, highly polished finishes caused by vibrations during shipment. It protects against rubs and blemishes without leaving any residue on the merchandise. You can get this low cost important added protection without affecting the weight or shipping strength of your container.

**Send for new free Stone-ize data sheet**

Send for your copy of the special data sheet on Stone-ize corrugated. It explains in full detail the many advantages of this new container development.

## **STONE CONTAINER Corporation**

4218 West 42nd Place, Chicago 32, Illinois • Sales Offices in most principal cities

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### **W. C. Ritchie and Company**

Chicago, Illinois

Folding cartons, set-up boxes, fibre cans, tubes, spools, cores, transparent boxes, and paper specialty displays

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Detroit, Michigan

Corrugated containers, folding cartons and set-up boxes



**WORLD'S LARGEST  
Mechanical  
Double Action  
Press  
by**



The huge press illustrated above marks a milestone in press development . . . the largest mechanical double action press in the world.

Vital Statistics—Rated capacity is 2500 tons. Weight is in excess of 1,000,000 pounds. Height is in excess of 38 feet. Bed and ram measure 90' (F-B) x 208' (R-L). The press operates at seven strokes per minute.

Just another big press? No, but this unique press is just another example of Verson's advanced concepts of press design and engineering. Whatever your press requirements, these concepts assure you of more press for your money...more profitable production in your plant. For specific recommendations, send an outline of your requirements.

**VERSON ALLSTEEL PRESS CO.**

9320 S. Kenwood Ave., Chicago 19, Illinois • 8300 S. Central Expressway, Dallas, Texas  
MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TOOLING •  
CUSHIONS • Verson-WHEELON DIRECT ACTING HYDRAULIC PRESSES

## Supplier News...

→ from Page 67

their new plant at 17450 Filer, in Northeast Detroit. The new building, which is devoted entirely to barrel plating, has an area of 10,000 sq. ft. A complete barrel plating service is offered, including zinc, cadmium, and phosphate coating. A wide variety of parts are plated to a quantity of 75,000 to 100,000 pounds per day on a two-shift operation.

## DU PONT EDUCATIONAL GRANTS INCREASED TO \$1,000,000

A fund of more than \$1,000,000 for grants to 122 universities and colleges, in its annual program of aid to education, was announced by the Du Pont Co. Nearly all of the increase, and more than half of the entire program, are for the improvement of teaching in universities, colleges, and high schools. The grant will support science and mathematics, as well as other subjects.

## NEW METHOD CUTS 80% FROM COST OF ROLLING COPPER STRIP

Robert Potter, president, E. W. Bliss Co., large manufacturers of metal working equipment, announced today the acquisition by Bliss of a 20 per cent interest in Chemetals Corporation, a research and development organization principally concerned with the production of copper powder by chemical methods and the fabrication of copper strip, tubing, and other wrought shapes directly from the copper powder.

The first of these processes is chemical. It involves the leaching of copper values from scrap, cement, matte, blister, or concentrates, and the reduction of high purity copper powder directly from solution in autoclaves by gaseous reduction. The second, or copper powder rolling process, enables the copper powder to be fabricated directly into copper strip, tubing, and other copper or copper-alloy end products without melting the powder into "cake" or ingot. This process, according to the report, results in a savings in capital equipment and operating costs of the magnitude of 70 to 80 percent of the costs of conventional methods.

## INLAND STEEL HAS BIG YEAR

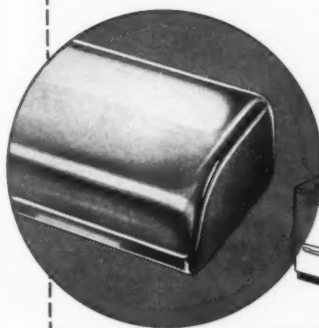
Inland Steel Company reported that 1956 was the second best production year in its history.

Ingot steel production totaled 4,916,000 tns, or an average operating rate of 94.5 per cent during the year, an-



*Actual case histories  
of unusual design problems  
solved by  
Pyramid Mouldings*

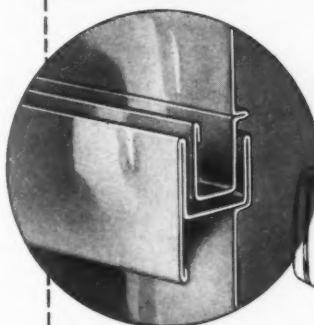
## Design Clinic



**The case of the range lamp...**



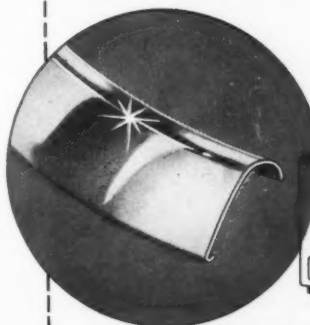
following the trend to longer lines has been ideally answered with rolled mouldings. Made to any desired length without change in tooling, ends are often formed as shown to eliminate costly end caps.



**Mouldings made "case" history...**



in one of America's leading luggage lines by adding the finishing touch to smart styling with these intricately formed bezels. Rolled to shape and bent to exact case contour, they covered raw edges, added structural strength, provided dustproof construction.



**The case of the missing "drop-out"...**

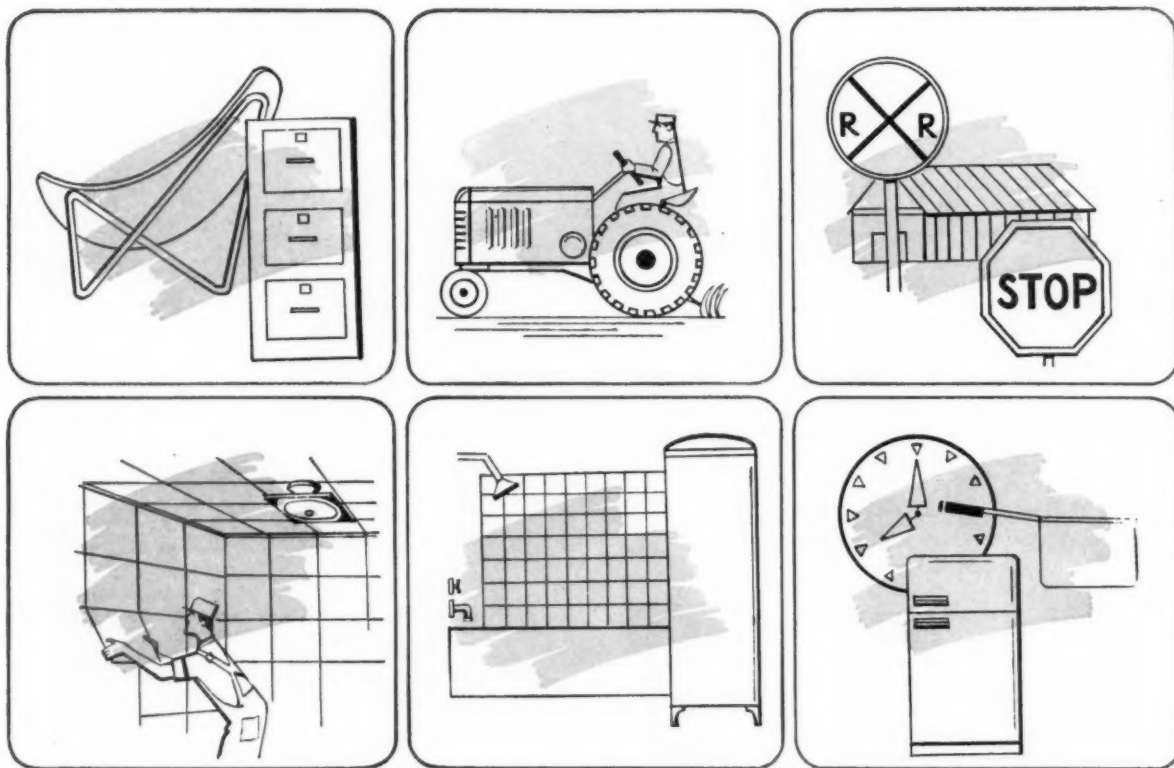


has meant money to the many manufacturers who have found that mouldings rolled in spirals and cut in circles eliminates waste unavoidable with stamped parts. Bezels, burner rings or any ring or bezel can be economically roll formed by Pyramid.

Write today for your free "Plan Book of Metal Mouldings"

# Pyramid Mouldings Inc.

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NEW YORK... CALIFORNIA



## Du Pont Porcelain Enamels for Aluminum Create Profitable New Enameling Volume

Today, appliances, furniture, architectural tile, signs, machinery—more products than ever before—are made of lightweight, durable aluminum. This expanding market offers you an excellent opportunity to build enameling volume with Du Pont porcelain enamels for aluminum.

Du Pont enamels come in an unlimited range of lustrous colors. Practically indestructible, they form a remarkably rugged finish-to-metal bond. These enamels are lightfast, resist weathering, corrosion, heat, impact and salt-water attack. And they are easily applied with ordinary enameling and firing procedures.

Whether you are a fabricator who now supplies unfinished aluminum or an enameler who would like to add aluminum to the materials you now finish . . . or convert your whole operation to aluminum finishing . . . investigate Du Pont enamels for increased enameling volume and profits.

**TECHNICAL ASSISTANCE . . .** Du Pont manufactures porcelain enamels . . . but does no enameling. As a pioneer developer in these finishes, we can offer you useful information on how you can expand your enameling volume by adding aluminum enamels to your line of finishing services. Mail the coupon today.

### DU PONT PORCELAIN ENAMELS FOR ALUMINUM



REG. U.S. PAT. OFF.  
BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.)  
Electrochemicals Department, Wilmington 98, Delaware

- ☐ Please send me Technical Bulletin CP 4-454 and illustrated folder on Porcelain Enamel for Aluminum.
- ☐ Have your technical representative call with further details.

NAME \_\_\_\_\_ POSITION \_\_\_\_\_  
FIRM \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_

nounced F. M. Rich, general manager of the company's Indiana Harbor Works. This was only 274,000 tons less than the record 1955 output, despite the loss of five weeks production during the steel strike last year.

Despite the near-record production pace, the Harbor Works lowered its accident frequency rate to the lowest in the 56-year history of the plant, Rich said.

## CONVEYOR SYSTEMS OPENS DETROIT OFFICE

Marvin H. Coleman, president of Conveyor Systems, Inc., 325 S. California Ave., Chicago 12, Ill., engineers, designers, and manufacturers of material handling systems and special material handling machinery, announced the opening of offices at 2832 E. Grand Blvd., Detroit 11, Mich. Hanson Equipment Co. will represent Conveyor Systems, Inc., from this location in the state of Michigan extending to Toledo, Ohio.

John DePottter, general manager of Hanson Equipment Co., will be in charge of the Detroit office.


## GE TO EXPAND APPLIANCE CONTROL FACILITIES

A new plant, to be built at Burlington, Iowa by the General Electric Co., will house part of the company's Appliance Control department, which is devoted to the manufacture of range timers. The 67,200 sq. ft. facility will help ease the demand for appliance controls which, according to Fred H. Holt, general manager of GE's Appliance Control department, "has more than doubled in the last four years, and requirements of the industry are expected to triple in the next ten years."


"New products are planned for this location, and we do not anticipate moving many of our existing lines from our plant at Morrison, Ill., or to cut any personnel there," said Holt. The Morrison facility recently manufactured its 6,500,000th appliance timer and, since its formation four years ago, has shipped over 24,000,000 controls and switches of all types, the report states. The department engineers, manufactures, and markets controls for refrigerators, air conditioners, home heating equipment, and washers and dryers.


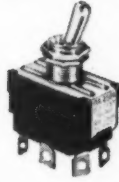




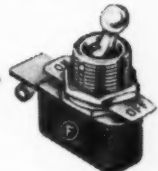






The plant at Burlington will be built on a 67-acre plot on the outskirts of the city, at an approximate cost of \$2,500,000, and will be faced with vertical aluminum siding.

to Page 88 →



# APPLIANCE SWITCHES





<p>10 Amp. 250 V. A-C 15 Amp. 125 V. A-C  ¼ H.P.-120-240 V. A-C</p> <p style="text-align: center;"><b>L-52-P</b></p>  <p style="text-align: center;">D.P.D.T. • on-off-on • Solder Lugs</p>	<p>10 Amp. 250 V. A-C 15 Amp. 125 V. A-C  ¼ H.P.-120-240 V. A-C</p> <p style="text-align: center;"><b>L-50-N</b></p>  <p style="text-align: center;">D.P.D.T. • on-on • Screw Terminals</p>
<p>15 A.—125 V. A-C 10 A.—250 V. A-C ¼ H.P.-120 Volts A-C 1 ½ H.P.-240 Volts A-C</p> <p style="text-align: center;"><b>2230</b></p>  <p style="text-align: center;">S.P.S.T. • on-off • Screw Terminals</p>	<p>3 A.—125 V.  6 A.—125 V. 3 A.—250 V.</p> <p style="text-align: center;"><b>1887-LP</b></p>  <p style="text-align: center;">S.P.S.T. • on-off • Solder Lugs</p>
<p>10 Amp. 250 V. A-C 15 Amp. 125 V. A-C  ¼ H.P.-120-240 V. A-C</p> <p style="text-align: center;"><b>L-42-E</b></p>  <p style="text-align: center;">S.P.D.T. • on-off-on • Solder Lugs</p>	<p>10 Amp. 250 V. A-C 15 Amp. 125 V. A-C  ¼ H.P.-120-240 V. A-C</p> <p style="text-align: center;"><b>L-40-A</b></p>  <p style="text-align: center;">S.P.S.T. • on-off • Screw Terminals</p>
<p>¼ Amp. 125 V. D-C 3 Amp. 125 V. A-C 6 Amp. 24 V. D-C</p> <p style="text-align: center;"><b>K-10-A</b></p>  <p style="text-align: center;">S.P.S.T. • on-off • Screw Terminals</p>	<p>10 Amp. 24 V. D-C 3 Amp. 125 V. A-C</p> <p style="text-align: center;"><b>L-20-E</b></p>  <p style="text-align: center;">S.P.D.T. • on-off-on • Screw Terminals</p>

## CIRCLE F MFG., CO.

TRENTON 4, NEW JERSEY

53<sup>rd</sup> Year

# New Supplies and Equipment

## NEW TIMING UNITS

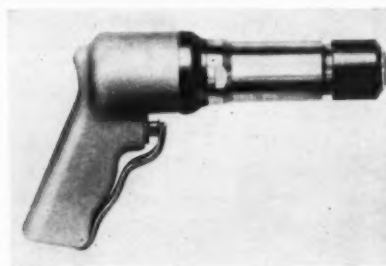


Recently announced, the development of a new timing unit that is capable of controlling single, multiple and sequential timing circuits. In addition it can be used effectively and efficiently as a high-low switch. This unit is now the most versatile in the mark-time line, since it can control many more types of industrial and commercial equipment as well as consumer appliances such as clothes dryers, dish washers and electric ranges. If additional circuits must be controlled, as many as four extra housings can be added to one unit. The new mark-time switch is available in timing ranges of 60 seconds to 12 hours and is

Underwriters' Laboratories approved for 28 amps 250 volts.

(Check No. 952 on Service Coupon)

## DELIVERS 2200 BLOWS A MINUTE



A new heavy duty air hammer, designed for a wide variety of industrial and automotive applications, has a bigger hammer and a bigger piston to deliver more punch. Though it delivers 2200 blows per minute at less than 80 PSI, it weighs under 4 lbs. and is extremely maneuverable. A patented safety chuck locks the various tools used with the hammer in six different positions. According to the manufacturer, the model can do heavy cutting, chipping, chiseling or grooving, yet is so light in weight and easy to handle that it keeps operator fatigue at a minimum.

(Check No. 955 on Service Coupon)

## I-BEAM TROLLEY CONVEYOR

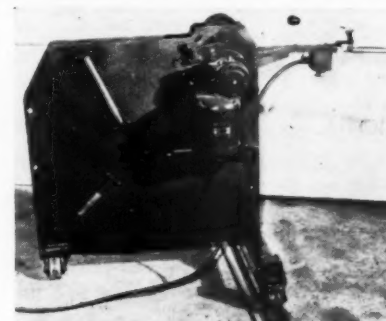
A new series of trolley conveyors for operation on either 3" I-beam or 2½" x 2¼" T-beam, for conveyor jobs under all types of conditions in ovens, spray booths, for dips, etc., has been announced. The series features a special design chain for long life and economy



of operation, with an ultimate strength of 18,000 lbs. A 2-piece positive grip design trolley eliminates the need for load pendants. Trolley capacities range from 80 to 160 lbs. and can be doubled by the use of load bars. The series is especially practicable for operation in temperatures up to 350°F. Systems up to 1000 feet or more with chain pulls up to 2000 lbs. can be operated with a single drive unit.

(Check No. 956 on Service Coupon)

## ELECTRIC STEEL STRAP DISPENSER



An electric power dispenser for cutting steel strapping to specified lengths dispenses strapping at an approximate rate of 250 feet per minute, and can handle any size of heavy duty strapping from ¾" x .028 to 2" x .050. It can be mounted on casters or installed permanently. The electric motor which powers the dispenser is equipped with magnetic brake. A hand shear with hardened and ground blades is an optional attachment.

(Check No. 957 on Service Coupon)

**METAL PRODUCTS MANUFACTURING**  
York Street at Park Avenue  
Elmhurst, Illinois

**FEBRUARY**

Please forward to me at once information on the new supplies and equipment and new industrial literature as enumerated below:

952	961	986	1002	1009
955	962	987	1003	1010
956	963	988	1004	1011
957	964	989	1005	1012
958	965	990	1006	1013
959	966	1000	1007	
960	985-A	1001	1008	

Name \_\_\_\_\_ Title \_\_\_\_\_

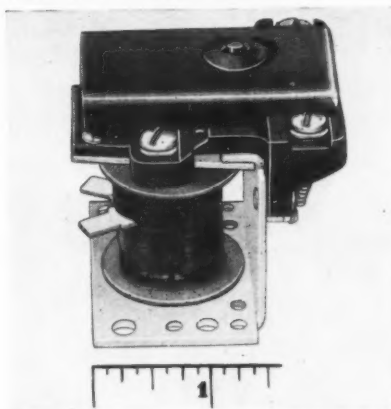
Company \_\_\_\_\_

Company Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

You will find more listings  
on Pages 79 and 80

## NEW APPLIANCE RELAY



A new appliance relay has been designed specifically for applications where trouble free operation and low cost are vital factors. Some of the design features are a molded terminal block, actuator, a dust and lint protective contact hood, and a contact action which prevents contact welding. This relay is available either in single pole normally open, or two pole normally open versions, with either screw or quick connect terminals available. Contact ratings per pole: 25 amps resistive 230 volts; (Two pole) 20 amps inductive 230 volts. For specific requirements, other ratings are available upon request. Coil ratings: up to 240 volts 50 or 60 cycle. The coil is furnished with quick connect terminals.

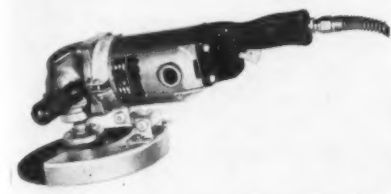
(Check No. 958 on Service Coupon)

## HEAVY ALUMINUM EXTRUSIONS

**New** A comprehensive 24-page booklet covering Aluminum heavy press extrusions is now available. The brochure is designed to aid purchasing, production and engineering personnel in their understanding of heavy press extrusions and the benefits possible through their use in a broad range of industries.

(Check No. 959 on Service Coupon)

## NEW 2 HP PORTABLE GRINDER



Streamlined outside, with permanently aligned and lubricated working parts, the new portable grinder packs 2 full horse-power into a tool weighing only 14 lbs. net. This heavy duty industrial

grinder with its high torque motor maintains perfect alignment through special manufacturing control and the complete use of sealed, pre-loaded ball bearings. Spindle thrust is taken by double-row ball bearings. Large cooling fan and vent areas assure cool motor operation, and an automatic reset overload protection switch prevents damage to motor. Matched spiral bevel gears, rated for 10 horsepower operation, transmit the high torque to the grinding spindle.

(Check No. 960 on Service Coupon)

## ZINC CHROMATE WASH PRIMER

This zinc chromate wash primer is formulated to stick to extremely smooth, non-porous surfaces, and to establish good "tooth" for finish coats. This primer is used to increase adhesion of coating systems on household appliances, air conditioners, picnic coolers, aluminum siding, etc. The primer dries for recoating within 15 to 30 minutes. Not intended as a permanent, protective coating in itself, it should be recoated.

(Check No. 961 on Service Coupon)

## LINE OF STRING BUFFS



A new line of string buffs for industrial polishing departments and job shops has been announced. Made of long fiber cotton strands, they are said to be tougher than the re-processed yarn usually used. Consequently, they withstand the effect of frictional heat and disintegration many times longer. As the face of the wheel wears, the ends of the cotton fray into fluffy fiber fingers that quickly wipe a "mirror" finish on metal parts.

(Check No. 962 on Service Coupon)

## SINK FRAME HANDBOOK

**New** Trade acceptance has been enthusiastic and highly complimentary to this guide which contains a complete listing of flat sinks, bowls, and lavatories of 46 manufacturers and the suggested frame to use with each.

(Check No. 963 on Service Coupon)

## LEAK-PROOF PALM BUTTON VALVE



A new leak-proof palm button valve is suitable for all general applications which require a normally closed straightway or three-way hand operated pilot valve. It was designed specifically for use in circuits where safety is of prime importance. This valve can be provided with a tumbler type lock, enabling the valve to be locked by authorized personnel in either the open or closed position. Due to its low operating force and large diameter palm button, the valve is designed to reduce operator fatigue. Although it is 1/4 NPT side ported, its overall height is only 2 3/8". The 3-way model has a non-piped exhaust and both straightway and 3-way have a 1/4" diameter flow capacity.

(Check No. 964 on Service Coupon)

## DIE CUSHIONS FOR PRESSES

**New** This 24-page catalog shows all types of die cushions for presses with J.I.C. bed openings from 14" x 14" to 213" x 87". Included are pneumatic, multiple piston pneumatic, pneumatic locking, hydro-pneumatic and custom type cushions, ranging in capacity from 3.93 tons to 301.5 tons, at 100 psi. The catalog provides complete performance and dimensional data on all cushions.

(Check No. 965 on Service Coupon)

## CHEMICAL RUBBER CHARACTERISTICS

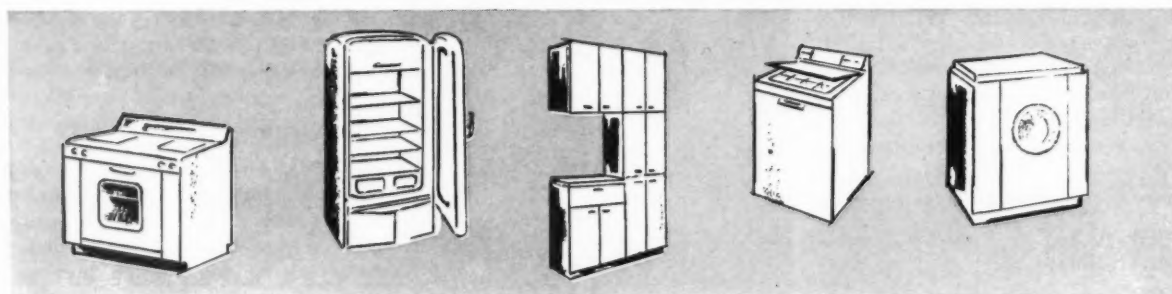
**New** How to obtain rubber products with greater resistance to deterioration is described in a new publication for industrial designers and engineers. The eight-page booklet tells how chemical rubber has solved numerous problems in product design and plant maintenance. The booklet shows by examples how these properties have proved advantageous to users of hose, belting, seals, coatings, and other rubber products.

(Check No. 966 on Service Coupon)



# AN ALL PURPOSE PORCELAIN ENAMEL FRIT ?

No, of course not . . . But OHCO 959A is the next thing to it. OHCO's 959A Tite Wite cover coat is the nearest thing yet to an all purpose porcelain enamel frit. It is ideal for refrigerators, ranges, washers, driers, dishwashers . . .



. . . and many other items. Why this versatility? . . . Because OHCO 959A is AA acid resistant, high in alkali resistance . . . has a wide firing range, good color stability, and works well with coloring oxides.

And 959A is tops in opacity, gives good coverage in a wide range of applications. It has been proven by performance in leading enameling shops. Try it and you'll find you save \$ on your production line. Ask your OHCO representative for a demonstration or call . . .

*"The World's Most Complete Ceramic Supplier"*

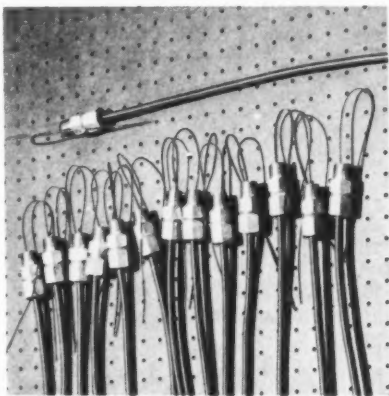
THE **O. HOMMEL CO.**

PITTSBURGH 30, PA.

WEST COAST—4747 E. 49th STREET, LOS ANGELES

## THERMOCOUPLE GLAND

Announcement has just been made of a new multiple wire thermocouple gland that provides easy entrance into pressure vessels of 1, 2, 4, 6 or 8 wires by an exclusive, simple, positive method of sealing bare wires at pressures from full vacuum to 20,000 psi. In addition, these



glands may be used at temperatures ranging from  $-300^{\circ}\text{F}$  to  $+1850^{\circ}\text{F}$ . This wide range of temperature and pressure is determined by the type of sealant used, neoprene, teflon or lava. The heart of the method of sealing high pressures up to 20,000 psi is the high degree of confinement of the sealant which is compressed between two porcelain insulators at pressures from 50,000 to 100,000 psi. Multiple hole insulators are available, from stock, housing single wires or combinations of 2, 4, 6 or 8 leads simultaneously. The multiple wire thermocouple glands can be furnished with standard threads; with or without conduit connection threads and open end protection tubes.

(Check No. 985A on Service Coupon)

## COLOR ANODIZED ALUMINUM FURNITURE TUBING OFFERED

Color anodized aluminum tubing has been made available to the furniture industry. The tubing is available in natural aluminum, gold and blue. Each of these colors is available with the following finishes: (1) satin appearance, (2) semi-bright, and (3) bright with high lustre. The tubing is available in  $\frac{3}{4}$ -inch,  $\frac{7}{8}$ -inch, and 1-inch diameters, in standard wall thicknesses.

(Check No. 986 on Service Coupon)

## BOX SEALING METHODS

A new revised edition of "How to Seal Corrugated Shipping Boxes," has recently been published. Subject matter outlines pro-

cedures recommended to cut losses, reduce waste, speed up and simplify sealing methods. Both hand and automatic sealing procedures are discussed, including application of adhesives, gummed and pressure-sensitive tape, stitches, staples and steel bands. Sealing procedures recommended for both regular slotted boxes and specialized box styles are also fully explained and illustrated in the booklet.

(Check No. 987 on Service Coupon)

## NEW RIVET DEVELOPMENTS

The latest development in rivets, a versatile new blind rivet, is described completely in a folder just issued. These new versatile rivets offer many advantages, including wide grip range, positive hole fill, high clinch and uniform stem retention. These new rivets simplify inventories, since the grip range is sufficiently wide that one shank length is satisfactory for all thickness of material handled by any rivet diameter. Specifications and design details of these unusual new rivets, as well as the listing of proper guns and heads for applying them, are given.

(Check No. 988 on Service Coupon)

## COMPLETE WIRE ASSEMBLIES

Wire assemblies in a variety of forms are available in any quantity, packaged for rapid identification and stock room handling. Preformed wire leads; intermediate stripped; with rings, loops, eyelets, tabs or open ends; terminal boards with tabs, turrets, or lugs, are but a few of the items available to suit any wiring requirement. The firm also furnishes cords, cables, harnesses, and fluorescent lamp assemblies.

(Check No. 989 on Service Coupon)

## SMALL THERMOCOUPLE HEAD

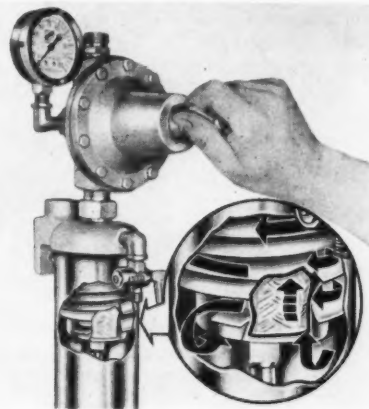


A miniature connection head (screw type) for thermocouples, electric heating elements or swaged, magnesium oxide, insulated conductors is available. Stem sizes adaptable to the new connector head are  $\frac{1}{16}$ " —  $\frac{1}{8}$ " —  $\frac{3}{16}$ " —  $\frac{1}{4}$ ". All sizes are made in two models, plain and with angle bracket. Operating temperatures range up to  $500^{\circ}\text{F}$ . Stress and vibration of the conductor is eliminated by transferring the load to stem or bracket.

(Check No. 990 on Service Coupon)

## OIL AND WATER EXTRACTORS

Two new oil and water extractors featuring an air capacity of 100 C.F.M. have been announced. Both units are termed ideal for lines where the amount of oil and water is excessively high. One model reportedly supplies up to 100 C.F.M. of clean, dry regulated air to as



many as six heavy duty spray guns at the same time. An enlarged and improved air regulator on the extractor is credited for the increased air capacity. A companion model is the same, but lacks the air regulator. Designed for use on main lines requiring non-regulated air, its high air capacity results from larger air inlet and outlet sizes. Spiral baffles with special absorbent filters in each of the extractors removes moisture, oil, rust, dirt and other foreign matter from the air before it reaches the spray gun. When dirty, the filter can easily be removed and washed in a petroleum solvent for reuse.

(Check No. 1000 on Service Coupon)

## CABLE CONVEYOR SYSTEMS

All the information needed to order and install a cable conveyor system, including an unusual diagrammatic plan for layout and dimensional calculations, is contained in a new 36-page illustrated engineering manual just issued. There is a separate section on special automatic safety controls that provides warning and prevents damage from abnormal load conditions of any kind on electrically driven conveyor systems.

(Check No. 1001 on Service Coupon)

## WIRE WOUND RESISTORS

Comprehensive data on winding technique, testing, tolerance, inductance, insulation, terminals, temperature coefficient, etc., charts and graphs. 4 pages of information on these mil type resistors.

(Check No. 1002 on Service Coupon)

## OPERATING POSITION OF NEW SWITCH ADJUSTABLE

A new, adjustable-lever-actuated basic switch's operating position is adjustable between .670 and .880 inch. Operating position is controlled by means of an adjustment screw without removing the switch from its mounting. The switch is particularly well suited for use on timers, computers or other multi-mounted switch devices. It is available in either straight or formed lever designs, and either with or without a roller. A choice of solder type or screw terminals is available, as well as a wide selection of preset operating characteristics. Contact arrangement is single-pole double-throw. The switch can also be supplied with split-contact double-throw circuitry. Characteristics are as follows: operating force,  $2\frac{1}{2}$  oz. max.; release force,  $\frac{1}{2}$  oz. min.; overtravel, .460 inch max., and differential travel, .007 to .50 inch.

(Check No. 1003 on Service Coupon)

## INDUSTRIAL PRESSES

**New** A comprehensive and fully illustrated 16-page bulletin, principally devoted to hydraulic and air-operated industrial presses of 25 to 150 ton capacity is offered. A total of 10 different models for varied industrial requirements are featured. Detailed specifications, capabilities, capacities and accessories have been incorporated in clear and concise tabular form together with photographs and outline drawings.

(Check No. 1004 on Service Coupon)

## CORROSION PREVENTATIVE

**New** A practical new 26-page bulletin on corrosion, its causes and control, has been prepared. The bulletin explains the seven types of corrosion which annually cost industry \$6 billion dollars in maintenance and suggests methods of surface treatment which gives maximum corrosion control. Other informative sections include primers, when and how they should be used, and how to finish various types of industrial insulation.

(Check No. 1005 on Service Coupon)

## NEW PROCESS CONTROL CHART

A process control chart which permits users of metal processing solutions to eliminate all figuring of quantities of chemicals necessary to maintain efficient strength, has just been released. With the new control chart, it is possible to post a permanent "make-up" record by

each tank for the particular product in use. Required solution additions are "read" directly from the chart, thus permitting operators to maintain efficient solution strength without troublesome calculations.

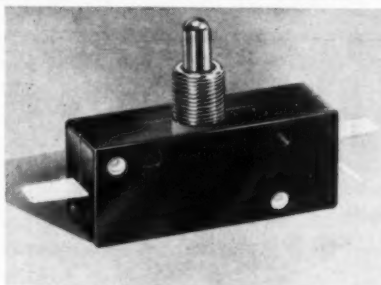
(Check No. 1006 on Service Coupon)

## 1-150 HP DC MOTORS

**New** 12-page bulletin illustrates and describes new dc motors built to new NEMA standards. Information is given on electrical and mechanical features, versatility of standard line, features for easier maintenance, plus dimensions and ratings. Also available is a new 6-page bulletin.

(Check No. 1007 on Service Coupon)

## IMPROVED SWITCH MECHANISM



An improved switching mechanism which provides longer life has been incorporated into a line of switches. This panel mounting switch has a liberal overtravel, total travel  $\frac{1}{4}$ " to  $\frac{3}{8}$ ", and is recommended where the actuating motion cannot accurately be controlled. The switch has high current capacity for direct control for a circuit. Available circuits include SPST, normally open or closed, and SPDT. Its construction makes this switch adaptable for door switch, push button switch or limit, safety interlocking and control applications.

(Check No. 1008 on Service Coupon)

## NEW RUST PREVENTIVE BASE IS MISCIBLE WITH WATER

A new multi-purpose rust preventive base which can be mixed with water, solvent or oil, or used neat, has been announced. This water displacing rust preventive base has an exceptionally wide range of uses for indoor protection. When mixed with water, it provides a safe, non-flammable emulsion with high stability and excellent protection value. It can be used to replace dangerous solvents or similar flammable slushes and is especially economical when mixed with water. Complete information, including physical properties and typical applications, are available.

(Check No. 1009 on Service Coupon)

## METAL FINISHING STANDARDS

**New** A new 12-page reference booklet on "Metal Finishing Standards" is offered. Described by the company as "a real first in the socket screw industry." The first section of the booklet is devoted to general facts on metal finishing, with a discussion of purposes for various types of finish, thread fits, formulas for calculating thread sizes before plating, quality requirements, hydrogen embrittlement, and protective handling and packaging methods. The second section, arranged in easy-reference table form, covers various types of plating, with a clear statement of advantages and limitations, applications, specifications, and appearance of each type. The third section is a similar table for various types of surface treatment. A corrosion resistance table follows, an outline of test methods, a section on stainless steel, and a listing of specification symbols complete the booklet.

(Check No. 1010 on Service Coupon)

## ELECTRIC HEATERS AND DEVICES

**New** A revised catalog describing industrial electrical heating units and devices is available. The catalog contains information and design selection charts on strip heaters, natural and forced convection air heaters, oven heaters, immersion heaters, cartridge heaters, melting pots, industrial hot plates, and heater control equipment. Information about selection of many special types is also included.

(Check No. 1011 on Service Coupon)

## PAINT PREPARATION DATA

**New** How to prepare metals for painting is the subject of a new, well illustrated folder. Information on paint strippers, rust removers, metal conditioners and metal cleaners, both alkaline and emulsion is given. The folder contains operating charts for metal working companies and job paint shops.

(Check No. 1012 on Service Coupon)

## ELECTRIC TEMPERATURE CONTROL

A new single-pole, single-throw, direct-acting thermostat, which opens at a pre-set temperature up to 550°F, is now available. The control, according to its makers, has a sensitive toggle-type snap-action mechanism and integral on-off switch. It is claimed that the unit will provide accurate response in the presence of considerable vibration.

(Check No. 1013 on Service Coupon)



*Elco  
Screws  
are  
Good  
Screws*

*... Ask a man who has used them*

**ELCO SEMS** The "Sems" method of pre-assembled screws and washers is used by ELCO to produce cost-reducing units of many kinds. Stock SEMS are made up of standard screws and washers — *special SEMS* can be designed, engineered, and produced to order as required. Let us quote on your standard requirements — send us your prints on specials. *Write for free package of samples.*



REMEMBER ELCO

WOOD SCREWS  
MACHINE SCREWS  
MACHINE SCREW NUTS  
TAPPING SCREWS  
THREAD-CUTTING SCREWS  
PHILLIPS AND SEMS SCREWS  
PIPE PLUGS  
STOVE BOLTS  
CAP SCREWS  
LAG SCREWS  
DRIVE SCREWS  
SPECIAL SCREWS  
COLD HEADED PRODUCTS

WE ALSO SPECIALIZE IN  
MAKING ANY OF OUR  
PRODUCTS OF THE  
FOLLOWING MATERIALS

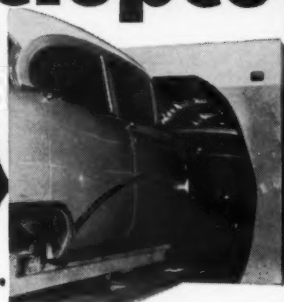
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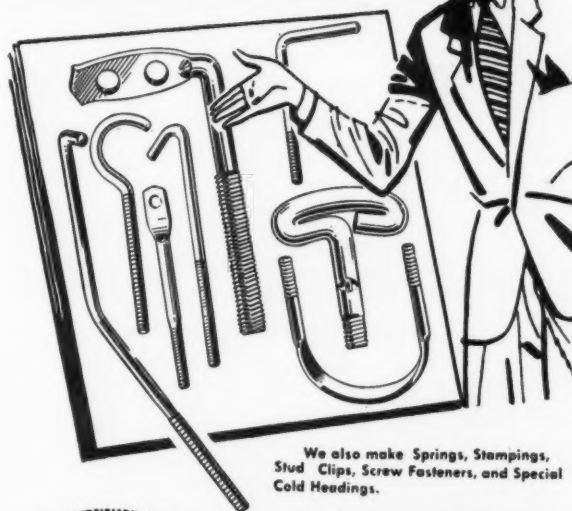
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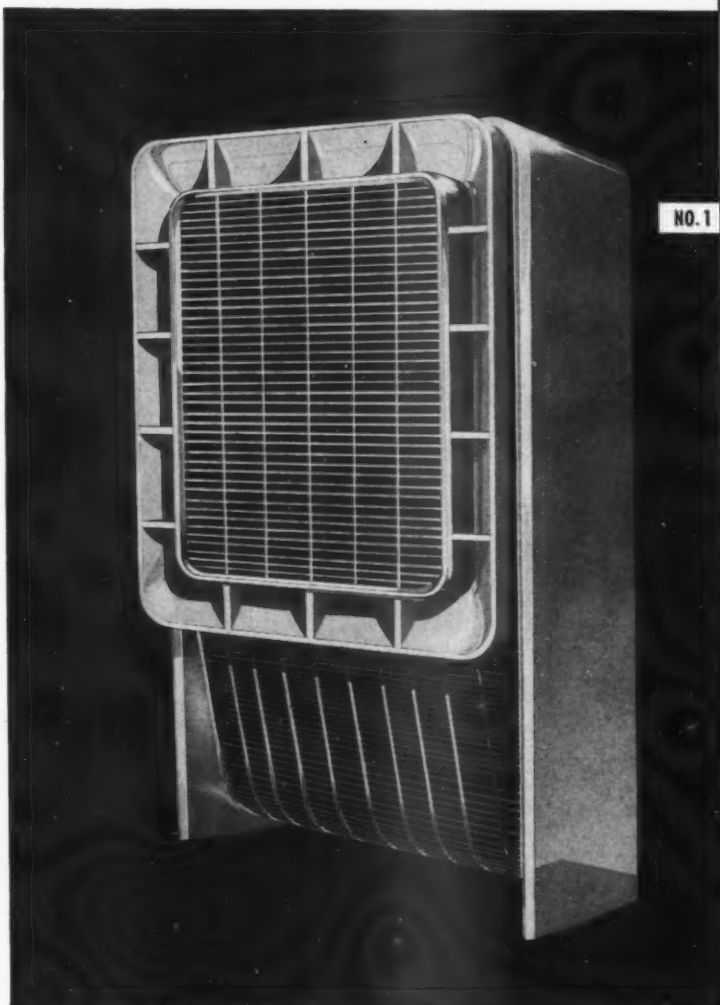
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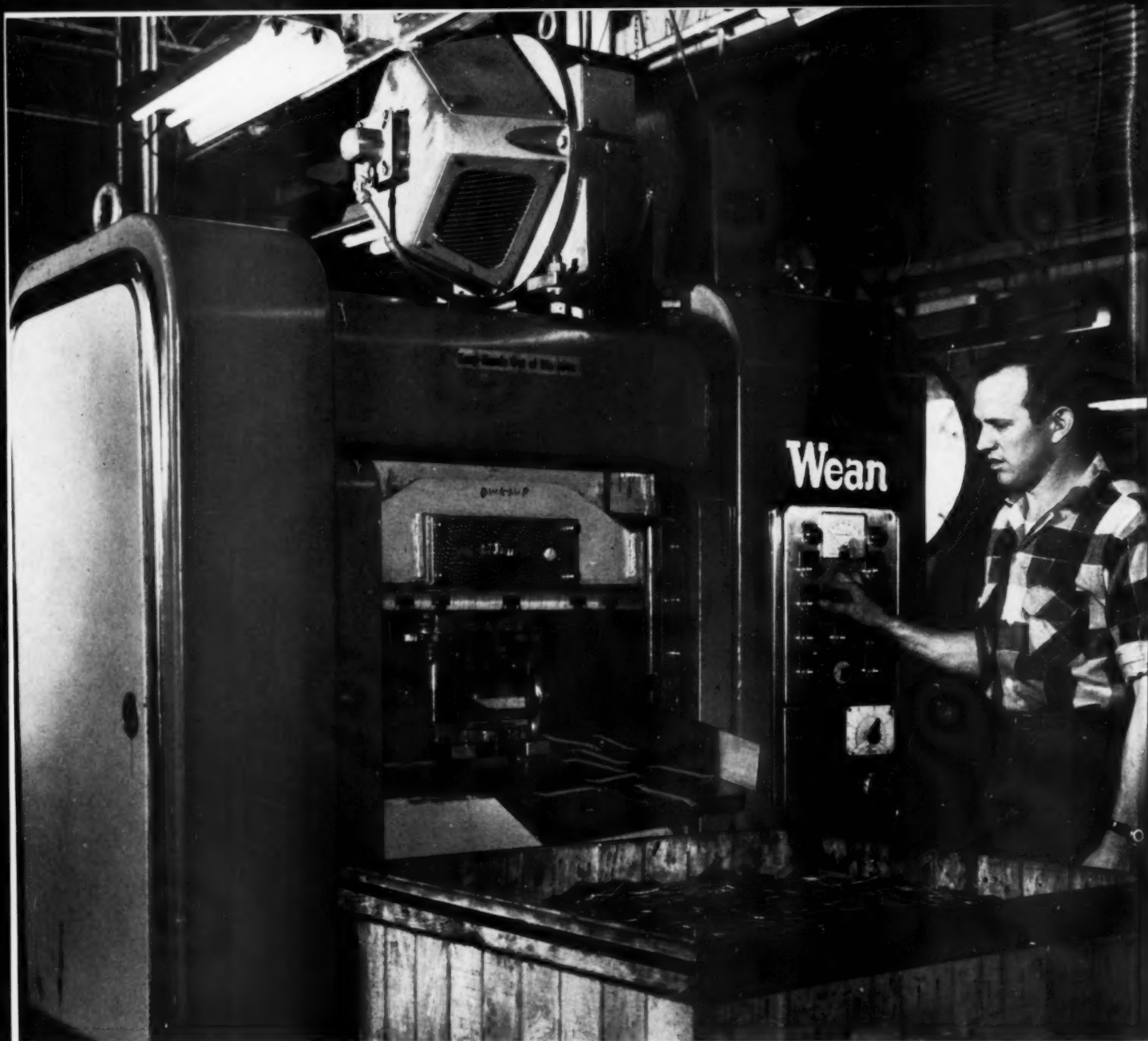
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**the fastest  
press in  
the world?**

WE THINK IT IS. While our top speeds have stayed around 600 strokes per minute on the "flying press," the size of piece is not restricted to washers and the like which are made on other high speed presses.

For example, where conventional presses rarely can process more than 100 feet of metal per minute, the "flying press" has performed at speeds in excess of 300 feet per minute.

One new model, for instance, blanks automotive assemblies 8 feet long at 45 per minute.

Yet, the "flying press" has other major advantages for you. Despite its revolutionary construction, it requires up to 20% less maintenance than other presses — it has no brake or clutch to wear. And, because of almost perfect dynamic balance, the press can be floor mounted.

We could write a book about the features of the Wean "flying press" — in fact we have. It's soon to be released . . . and it's yours for the asking. Write to the address below. We will mail your copy of the Wean "Flying Press" brochure as soon as it comes from the printers.

 **Wean** Equipment Corporation  
CLEVELAND 17, OHIO

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DESIGNS DEMAND THE  
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***Youngstown Sheets  
and Strip***



Detroit's high-speed automobile body presses are busier than ever turning out body components for today's modern-design cars. More intricate door and fender sections of the new models demand a steel of the highest quality that can take the required deeper draws in its stride. Without question, that steel is Youngstown Cold Rolled Sheets and Strip—the best available anywhere.

Youngstown blends the required combination of surface finish, tensile strength and ductility into every sheet, to provide you almost continuous pressings of even the most difficult-to-form parts. Also, metallurgical quality never wavers from Youngstown's high standards because all operations from ore mining to shipping dock are rigidly quality-controlled by experts with over half-a-century of steelmaking know-how.

On your next order specify Youngstown Cold Rolled Sheets and Strip and join the ranks of our satisfied customers who tell us: "Our production's up—Rejects down—Fabrication costs lowered."

Why not call your nearest Youngstown District Sales Office today, for metallurgical aid or additional information—or write directly to our Home Office.



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Close-fitting covers prevent leakage; can be tightened by hand. Equipped with Neoprene or rubber gaskets. (Neoprene recommended for oil base grinding.) Quart, gallon and two-gallon sizes. Ball charge included.



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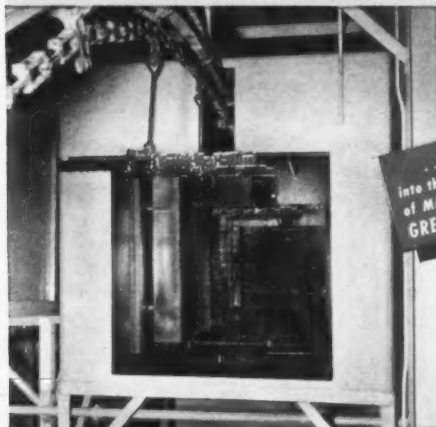
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# COMPLETE *Finishing* SYSTEMS

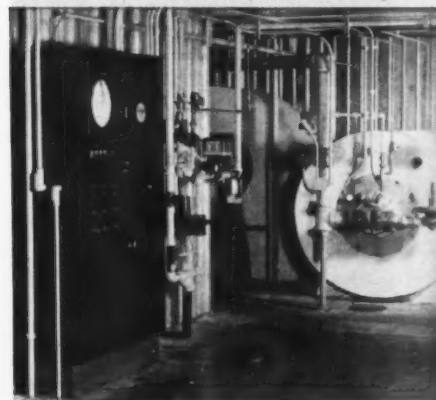
... for ENAMELS • LACQUER • PAINT • VARNISH



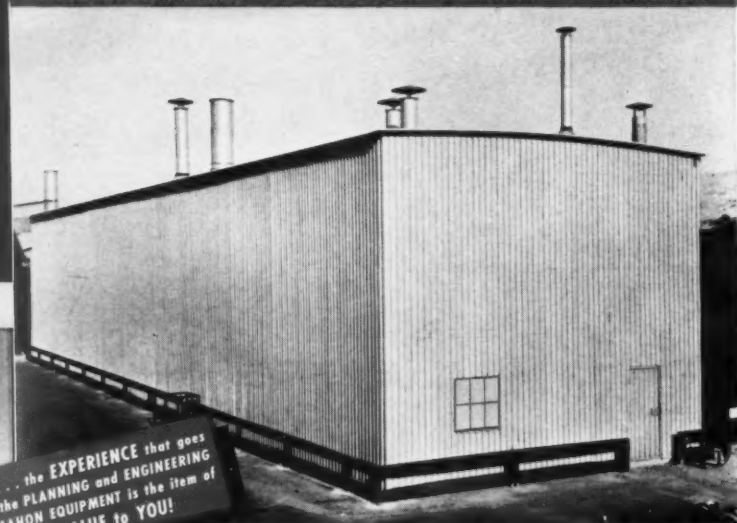
Truck Parts Entering Five-Stage Metal Cleaning and Rust Proofing Machine in the Mahon Self-Housed Finishing System at Right.



Entrance End of the Mahon Flow Coater. Equipment is provided to maintain Paint at a Constant Temperature and Viscosity.



Mahon Control Panel which Houses Temperature Recorders, Control Switches, Signal Lights and Automatic Safety Devices.



Complete Mahon Self-Housed Finishing System Installed Adjacent to Manufacturing Buildings at International Harvester Company's Plant, Fort Wayne, Indiana.

... the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!

## SELF-HOUSED Mahon Finishing System OUTSIDE of PLANT Solves Many SPACE PROBLEMS!

In industrial plants where adequate space is not available, or where floor space and headroom restrictions would seriously interfere with the planning and the engineering of an efficient and economical production finishing system, Mahon engineers recommend installation of a Self-Housed Finishing System on the roof of the plant, or outside the plant adjacent to manufacturing buildings . . . the installation illustrated above is an excellent example. In such installations, no restrictions are imposed by either floor space or headroom; consequently equipment can be planned and coordinated for maximum efficiency. In this particular finishing system, the equipment is installed on two levels . . . the Five-Stage Metal Cleaning and Rust Proofing Machine, the Flow Coater, the Ventilated Drip Enclosure, and the Control Panel with Recording Instruments, are located on the ground level. The Dry-Off Oven, Finish Baking Oven, Oven Heating Units, and Air Supply and Exhaust Equipment are located above on the second level. The roof and walls, which house the complete system, are an integral part of the Oven Construction. This is a highly satisfactory Mahon solution of one manufacturer's production painting problem. When you are confronted with a finishing problem, you, too, will want to discuss it with Mahon engineers . . . you'll find them better qualified to advise you on both methods and equipment requirements. See Sweet's Plant Engineering File for information, and typical Mahon installations, or write for Catalog A-657.

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# MAHON



## BIG OAKS FROM LITTLE ACORNS GROW

→ from Page 75

The O. Hommel Company held an intensive, two-day sales meeting at its home office in Pittsburgh on November 19 and 20 to bring its field sales and service staff up to date on the latest company developments.

During the meeting, discussion on the problems and techniques of color matching was held, and a summary of probable market conditions was advanced by Ernest M. Hommel, company president. "With the present merger pattern," he said, "it has become apparent that the same thing is taking place in the porcelain enameling industry that has happened in years past in other phases of American industry. That is, the formation of industry 'giants' seems to be taking place, in a manner of speaking." Hommel pointed out that this meant that the bulk of enameling would eventually be done by fewer plants, and that this indicated increasing strength for the industry as a whole. "But," he added, "this does not mean that we can forget the little fellow. We were little once. Some of the smaller companies today may be the giants of tomorrow. And the important thing for us to do is help them all grow."

## REYNOLDS METALS INCREASES CONSTRUCTION PROGRAM


Reynolds Metals Co. has purchased property in St. Louis on which will be constructed a new regional sales office building which will utilize aluminum to the fullest extent. The announcement was made by David P. Reynolds, vice president in charge of sales.

The regional sales manager for Reynolds in St. Louis is F. L. Sargeant. Under this south central office are the cities of Dallas, Denver, Houston, Kansas City Mo., Little Rock, Memphis, New Orleans, San Antonio, Tulsa, and Wichita.

Reynolds stated that the proposed new building is a part of the company's overall expansion, as a result of increasing sales activities. Expansion plans call for buildings in other cities, including a sales office in Detroit. In Richmond, Va., Reynolds has under construction a \$10 million general office building, previously announced, which is set for completion by mid-1957.

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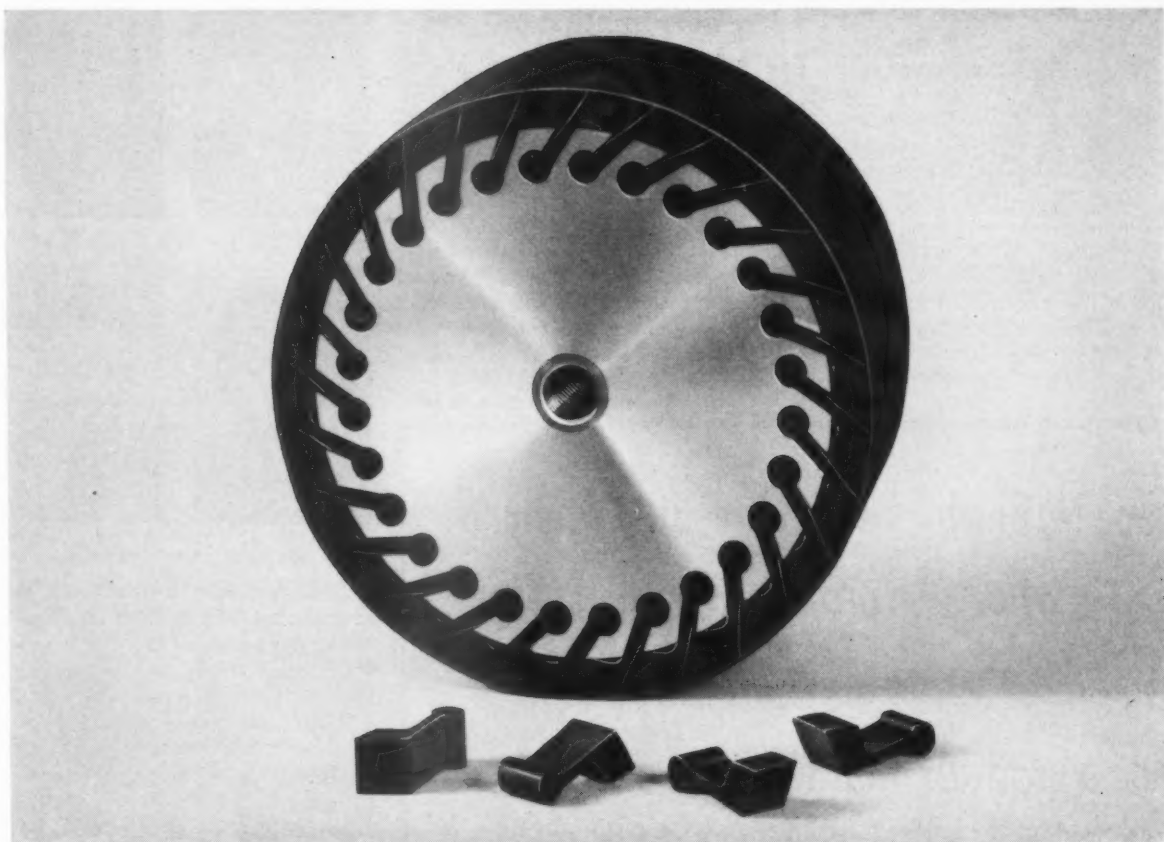
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## New FLEXCORE grinding wheel with interchangeable rubber segments reduces operating costs and gives greater application flexibility

Twenty-eight separate, replaceable rubber segments (flexers) grip the coated abrasive and form the grinding surface of the new Flexcore grinding wheel. This interchangeable feature provides the following advantages:

**LOW OPERATING COST.** As flexers become worn or damaged they can be replaced singly or in groups. The core never needs to be replaced . . . the original investment is never lost. The cost for a complete set of replacement flexers for an average Flexcore wheel is only \$4.50.

**VARIABLE CUTTING ACTION.** Flexers are available in a variety of hardnesses and so can be used in any combination to attain different cutting actions. For example, a fast cutting action is achieved by using hard

segments and soft segments in alternate slots.

**POSITIVE GRIP ON ABRASIVE BAND.** The Flexcore is so designed that the flexers make complete peripheral contact with the coated abrasive band. This provides greater holding power so that the wheel can be operated at much slower speeds than is possible with conventional expanding-type wheels.

Flexcore wheels are manufactured under rigid quality control standards. Slots are uniform in size and number. Flexers are identical. The core is balanced at the factory and stays balanced in use.

SEND TODAY for complete specifications, wheel sizes and prices.

N-116

**NU-MATIC GRINDERS, INC.**

8224 Carnegie Avenue

Cleveland 3, Ohio

## SUPPLIER PERSONALS

Chicago Vitreous Corp., Cicero, Ill., manufacturers of porcelain enamel frits, has named *L. A. Johnson* director of research, and *W. J. Plankenhorn* assistant director of research, according to an announcement by *William Hogenson*, president. Johnson joined the firm in 1937, and spent several years in the research division's chemical laboratory. Plankenhorn, a graduate of the University of Illinois, received his B.S. degree in ceramic engineering in 1931, and his M.S. degree in 1949, joining Chicago Vitreous in 1954.

*Robert R. Swanton* and *Ted A. Sailor* recently joined the Industrial Department of Wyandotte Chemicals Corp. Swanton will headquarter in Wyandotte's Detroit office; Sailor in the company's Chicago district.

*Morris M. Messing* is president of the new Sel-Rex Corp. which came into being through the merger of Bart-Messing Corp. and Sel-Rex Precious Metals, Inc. The products manufactured by each of the latter companies, as well as all marketing functions and activities, will hereafter be carried on by separate divisions within the new corporate structure.



JOHNSON



PLANKENHORN



SWANTON



SAILOR

*E. B. Thompson*, assistant sales manager of Parker Rust Proof Co., Detroit, Mich., was promoted to the post of general sales manager, it was announced by *M. B. Roosa*, vice president in charge of sales. Thompson joined Parker 19 years ago when he graduated from the University of Michigan, and was assigned to Parker's New York office sales-service staff. He was later promoted to Western Region and Chicago office manager, which post he held for 8 years before his transfer to Detroit as assistant sales manager.



MESSING



THOMPSON

*Victor Cole*, who has been associated with development and sales of the absorption units which use heat energy to produce cooling, moves to the air conditioning firm's Southwest region as sales engineer for "big air conditioning" equipment.

Election of *W. J. Williams* as vice president and treasurer of Aluminum Industries, Inc., Cincinnati, Ohio is announced by *Harrison O. Ash*, president. The company manufactures aluminum permanent mold and sand castings, aluminum paints, automotive replacement parts, and other specialty materials.

Joe McBlurb was a finishing foreman who had a problem. He had this problem because his company made a product that was entirely different from anyone else's product. He tried thinking it out. He tried experimenting. He even tried finding the answer in the library. Then it came to him in a flash! — **APEC OFFERS PERSONALIZED FIELD SERVICE TO SOLVE ENAMELING PROBLEMS**

... EXPERT SERVICE THAT IS —AND  
QUALITY APEC FRITS — CALL OR WRITE US!



american porcelain enamel company  
PHONE 2-3608 • 1285 KEATING AVE., MUSKOGEE, MICHIGAN

Richard L. Lukey has been named appliance market sales engineers by the parts division of Reynolds Metals Company. The announcement came from the division's headquarters at Louisville, Ky.

Lukey, 28, joined Reynolds in late 1956 after serving for three years as sales representative for Houdaille Industries, Inc., North Chicago. He was previously employed by the Frigidaire Division of General Motors Corporation, Dayton, Ohio.

To expand new product service facilities, Mac Dermid, Inc., Waterbury, Conn., has announced the appointment of J. Douglas Patrick to the post of product development engineer. Under Patrick's direction, Mac Dermid product development, originating in the company's research laboratories and tested in the customer service laboratory, will be field tested under production conditions in customer's plants.



SWIFT



PATRICK

William R. Swift, an industrial engineer with extensive experience in metal cleaning, finishing, and lubrication, is now general field service representative for Cowles Chemical Co., Cleveland, Ohio. His appointment was announced recently by Carl C. Clabaugh, manager of Cowles' metal finishing chemicals department.

The Cook Paint & Varnish Company, Kansas City, Mo., announces election of Lathrop G. Backstrom, president, to the office of chairman of the board. He succeeds the late R. B. Caldwell. Backstrom will continue as president.

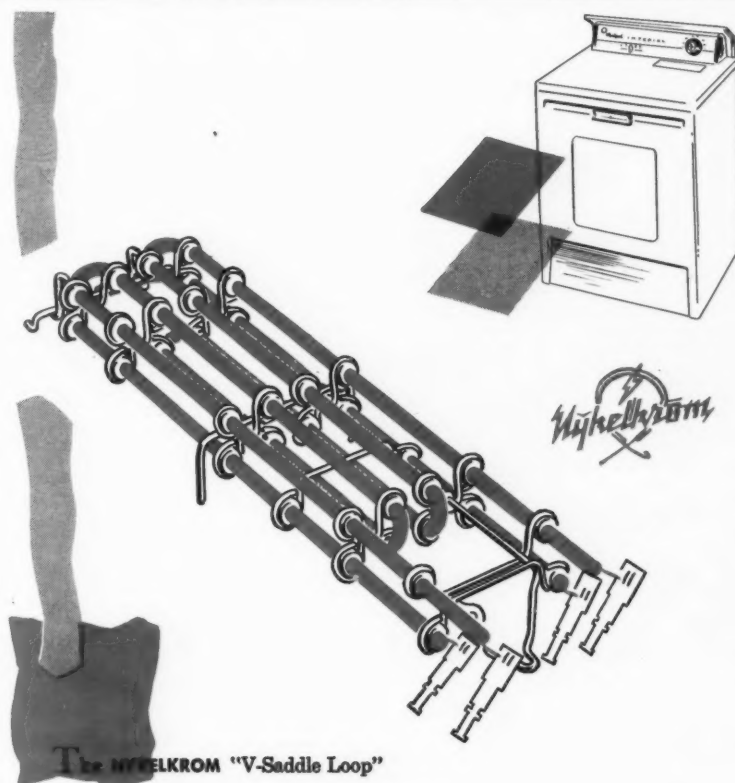
W. H. Hoover, vice president in charge of industrial sales, assumes added duties as executive vice president.

G. A. Nichols, vice president of research, United Wallpaper, Inc., has announced the addition of Joseph E. Gaske to the staff of the Central Research Laboratories. He will direct the Central Laboratories' industrial finishes research program. Gaske has been in the coatings industry since 1949.



#### WYANDOTTE EXECUTIVES PLAN SERVICES FOR 1957

At the recent annual District Sales Managers Conference of the J. B. Ford Division, the executives shown scheduled a series of field and home office instructional sessions. L. to r. are: Fred Tholen, sales mgr.; Don Anderson, director, Technical Service dept.; Ed Kubis, mgr., Industrial Sales; Jim Ramsey, mgr., Railroad Sales; P. N. Burkard, mgr., Industrial, Railroad, and Aircraft dept.; and Fred Ballantyne, Jr., Wyandotte v. p.



The NYPELKROM "V-Saddle Loop"  
heating elements used in  
WHIRLPOOL Dryers assure maximum  
drying efficiency . . . plus a  
long, life of dependable performance.  
These famous "V-Saddle Loop"  
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#### wants more information

Gentlemen: I read with much interest your article in the December, 1956 issue, page 56, of the automatic welder which completed 360 welds per hour with one operator. I would appreciate receiving additional information on the type of welders used, the turntable mechanism, and the types of work fixtures used in this unit. If possible, please indicate where this machine is located, and if it would be possible to see this unit in operation.

E. Dahl  
Manager of Parts Fabrication  
& Methods Development  
Radio Corp. of America  
Cambridge, Ohio

Ed Note: Mr. Dahl, your inquiry has been forwarded to Mr. Leonard E. Nichols at Resistance Welder Corp., Bay City, Mich., who will most certainly see that complete information is sent to you.

#### subscribes to magazine

Gentlemen: I would like a one year subscription to the magazine entitled "Finish." Please forward bill to Accounting Department in care of Vendorlator Manufacturing Company.

E. J. McBride  
Manager, Quality Control Division  
Vendorlator Manufacturing Co.  
2550 S. Railroad Ave.  
Fresno, Calif.

Ed Note: Mr. McBride, in your capacity of Manager, Quality Control Division, you are entitled to a subscription under our controlled circulation policy. Your subscription was started with the January, 1957 issue.

#### a mark against us

Gentlemen: It was with considerable dismay that I noted the use of the term "porcelainize" on pages 11 and 12 of the December issue of *finish*. I am sure that porcelain enamel was being referred to as the material applied to the aluminum sheet. As you are well aware, "porcelainize" is the trade name for an automobile polish. I bring this to your attention in view of the recent ruling of the Federal Trade Commission regarding the use of the term "porcelain enamel." Since this is the term which our industry is entitled to use to identify its superior material, we should do everything to protect the term and its use.

R. S. Sheldon  
Supervisor of Ceramic Research  
Whirlpool-Seeger Corp.  
St. Joseph, Mich.

Ed Note: It was merely an editorial oversight to allow this word to appear twice in the article as our standard to be used is "porcelain enameling." In the feature referred to, there will be little chance of misinterpretation for, while "porcelainize" was used twice, all of the following correct terms appear in the same article: Porcelain enamel; porcelain enameled aluminum foil; the porcelain enameling industry; porcelain enameled aluminum porcelain enamel slip; porcelain enameled steels; and aluminum enamel appears three times. Thanks for your interest. We're glad to see that you're keeping a "close eye" on our editorial content.

#### errata

A top executive of Texlite, Inc., Dallas, Texas, comments favorably on our photographic presentation of a modernization job on the First National Bank of Salida, Colorado, for which their company furnished the architectural panels. In friendly fashion, he also calls our editors' attention to the misspelling of their company name the second time it was used in the descriptive caption. "Texlite" as first used is, of course, correct. Its next use, which avoided the keen eyes of all proof readers, indicated a complete switch of industries and was spelled "Textile." Our apologies to TEXTLITE.

## SUB-SIEVE GRINDING

→ from Page 29

frit become smaller with increased grinding. Such curves as these are remarkably reproducible from mills of the same type charged similarly but may vary in slope when samples are taken from mills with varying capacity or type of charging. Standard or reference curves must be established for the particular capacity and type mills to be used.

### The Hegman Grind Gauge test

Another test which has been used with varying degrees of success is the Hegman Grind Gauge. The gauge is a steel plate containing two parallel inclined depressions 0.005 inches deep at one end and zero inches at the other. Material to be tested is placed in the deep end of the depressions and a knife edge drawn over the surface toward the shallow end.

When the surface of the resulting wedge of material is viewed at an oblique angle, coarse particles are seen breaking through the smooth surface along the depression at the point where the depth of the depression becomes less than the diameter of the particles. The point on the scale where this occurs is taken as the endpoint of the test.

On the gauge, there are three graduations or scales. The first is the Production Club or P. C. scale, the second a Mills scale, and the third the N. S. scale. Data presented here were obtained by reading the Production Club scale on the gauge. Figure 2 shows a comparison of results obtained with the Settling Test and with the Hegman Fineness Gauge. Good correlation between the two tests is indicated here but such is not always the case. Poor reproducibility of results with the fineness gauge may be encountered due to the inability of different operators to interpret results similarly. Even with rigid adherence to test procedure, reproducibility of results by the same operator or by different operators is not as good as with the Settling Test. The fineness of grind test does, however, have the advantage of requiring even less time for performance than the Settling Test and as a result has been used as a preliminary test to determine if fineness of a mill is approaching "range". The Settling Test may then be used as the umpire test to terminate grinding of a mill.

<sup>1</sup> Cooke, R. D., "A Fineness Test for Pebble Mill Control," *Enamelist*, 2 (4) pp. 11-14 (1925).

<sup>2</sup> Whitehead, M. H., "Some Observations on the Use of a Settling Test for the Determination of the Fineness of Porcelain Enamels," *Proceedings of the Fourth Annual Porcelain Enamel Institute*, pp. 103-113 (1939).



## AN OUTSTANDING FEATURE OF PATTERSON ENAMEL MIXERS

Patterson Mixers deliver years of satisfactory service under rugged operating conditions because each component is engineered specifically for the job. Drives, stirrers, tanks, linings and valves are integrated for your production requirements, plus the extra performance margin that lowers maintenance and increases operating life. Let us quote on your needs.

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For the Ceramic Industry: Grinding Mills, Batch and Continuous . . .  
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- the *ideal*  
*between-operation rust*  
*proofing solution -*

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**CARBURETOR** bodies and large engine castings being treated with Macco Blucoat to prevent rust after machining and during storage.

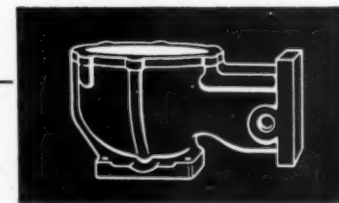
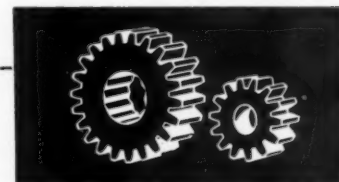
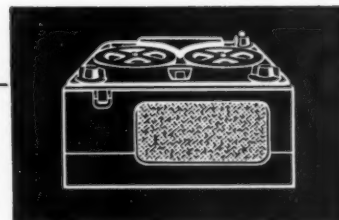
**AUTO** bodies of some of the world's largest body manufacturers are given the Blucoat treatment to prevent rust after drawing or machining.

### 5 Reasons for BLUCOAT'S NATIONAL ACCEPTANCE

Macco Blucoat is the amazingly efficient rust preventive used by leading metal processors and fabricating manufacturers everywhere. Endorsed as the only practical method of preventing rust between production operations and assembly—and during transportation and storage.

1. Water soluble—economical, yet extremely efficient.
2. Adaptable to an almost unlimited variety of applications and conditions.
3. Works equally well on steel, cast iron, forgings or die castings.
4. Leaves no oily film. Assures better adhesion. Collects less dust, chips, etc.
5. Blucoat has withstood perfectly a salt spray test of more than 80 hours. Vastly superior to soluble oil. Non-poisonous. No alcohol. Extremely stable.

For the prevention of rust, Blucoat positively has no equal. Whether for the finest of automobile bodies or simply bale tie-wires, Blucoat's versatility makes it most indispensable for any processing plant.

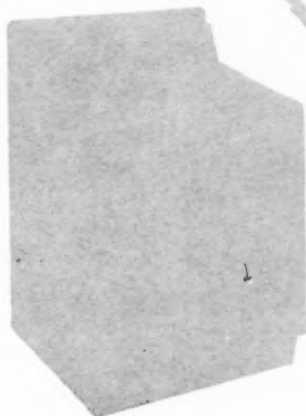


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Epoxy primer for flocoat, dip or spray. Flowing, flexibility, stability and adhesion characteristics are excellent. High resistance to detergents, humidity and salt spray.

**PERMAGLO ENAMEL**

High gloss Alkyd-Amino finish available in white and custom colors. Manual, automatic or electrostatic spray application. Excellent hiding and color retention. High degree of hardness and highly resistant to detergents, humidity and salt spray.

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*Shippers of widely-diversified precious cargoes place their confidence in Gaylord packaging ingenuity. They're often amazed at the economy of the box that does the job.*

*Your nearby Gaylord packaging engineer offers you confidence at no premium. Call him.*

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**GAYLORD CONTAINER CORPORATION ★ ST. LOUIS**

DIVISION OF CROWN ZELLERBACH CORPORATION

February, 1957

safe transit

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York Street at Park Avenue  
Elmhurst, Illinois

**editorial voice of the national safe transit program**

devoted to improving packaging methods and shipping and materials handling methods for the appliance and metal products manufacturing industries. This section contains plant experience information and industry advances for the use of all executives and plant men interested in improving packaging and shipping methods and in loss prevention. The section contains complete information on the national safe transit pre-shipment testing program for packaged finished products and detailed reports of divisions and sub-committees of the National Safe Transit Committee.

## SAFE TRANSIT NEWS

### NATIONAL SAFE TRANSIT COMMITTEE

*Associations Building, 1145 - 19th St., N. W., Washington 6, D. C.*



56th Safe Transit Laboratory Certified - The Gaynes Engineering Company, 1642 W. Fulton St., Chicago, Illinois, was recently certified by the Committee, bringing the total of NST-certified laboratories up to 56. Gaynes has been a source of NST-approved testing equipment for some time.

- - - - -

Westinghouse Buffalo Works Benefits from Program - The Westinghouse Electric Corporation's Motor Division in Buffalo, New York, recently reported on the many benefits they have obtained from their participation in the Safe Transit Program. This plant manufactures medium size motors--from 1 hp to 20 hp. Mr. John E. Sacks, Superintendent of Shipping, Receiving & Transportation, reports as follows:

"Cost Reduction--This Program has resulted in \$17,000 cost reduction so far in 1956. In many of our items we were over-packaged and through the use of this Program, we have not only made savings in dollars, but in time and material and, in many instances, lower transportation charges result from the reduction in container weight.

"Tool for Engineering and Quality Control--We have been able to determine engineering defects prior to the product reaching the customer, thereby eliminating field charges and dissatisfied customers.

"Tool for Manufacturing--Manufacturing areas benefit from quick and more economical methods in the use of this Program.

"Traffic and Sales Department--Carriers respect the NST label and handle material more carefully, thus further reducing damage to our products. Our customers respect the NST label, as well; and our salesmen can use the NST label as an educational selling tool."

This letter serves as a good illustration as to how the NST Program can be used not only as a means to reduce in-transit damage to an acceptable minimum but also as a tool for reduction in costs--both in dollars and cents and in customer ill-will--in other phases of overall plant operation. The label also works in a very positive manner as a good will ambassador for increased prestige and as a sales tool.

## A 16-WEEK INDUSTRIAL PACKAGING COURSE SCHEDULED

A 16-week Industrial Packaging course is scheduled to be held on the Hoboken, N. J., campus of the Industries Training School of the Stevens Institute of Technology. The course will open February 4, and is designed to provide engineering fundamentals and specialized know-how to personnel engaged in all phases of the packaging field. Emphasis will be placed on design, economic and protective aspects of materials and containers, and the integration of packaging with production, warehousing, and shipping.

The course will be taught by Walter F. Friedman, consultant with Container Laboratories, Inc. Lectures will be supplemented by plant tours, movies, and course problems, and are to be conducted in seminar style, permitting maximum participation of students.

Some of the topics covered will be: cushioning, testing, National Safe Transit, domestic and military regulations, container design, cost estimating, preservation, machinery, specifications, quality control, principal material and container types, etc.

Sole qualifications for admission is high school education.

## SCOTTISH PLAID CONTAINER INTRODUCES MAYTAG WASHER



Something new and colorful is this multi-colored plaid shipping container made by Gaylord Container Corp., Division of Crown Zellerbach Corp., for the introduction of Maytag's new Highlander automatic washer. The container emphasizes the low cost of the new budget-priced model.

## CANADIAN PACKAGING SHOW TO BECOME YEARLY EVENT

Exhibitors at the 5th Canadian National Packaging Exposition, held during late 1956 in Toronto, Ont., Can., were making inquiries about space in the 1957 show even before the 1956 show closed, according to T. M. Dutton, newly-elected president of Packaging Assn. of Canada, and general exposition chairman.

Enthusiasm was greater than at any of the previous shows, and many of the 175 exhibitors were talking in terms of increased space this year. Result was the announcement by Dutton, before the show's closing day, that there would be a 6th Canadian National Packaging Exposition, November 5-7. A further 25 booths would be added, making a total of 350.

According to G. W. E. Gordon, general manager of Packaging Assn. of Canada, the more than 17,800 visitors to the exposition comprised the best audience the show has ever had. "In talking over the show with exhibitors," Gordon said, "we were most encouraged to learn of the success they enjoyed, mainly because of the high caliber of visitors who attended the show."

to Page 100 →

# SUS-RAP

**safe, economical packaging**  
FOR FRAGILE PRODUCTS-ANY SHAPE-ANY SIZE

**Vertical-Horizontal** suspension safeguards your product in and out of carton . . . Fewer packaging components required . . . pad folding eliminated.

SUS-RAP is engineered to your product and pretested by N.S.T. procedures

**SUS-RAP**

Laboratory Developed and Tested Packaging

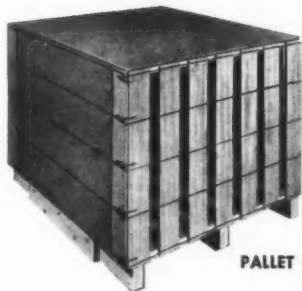
**VANANT COMPANY, INC.** 954 S. Water Street Milwaukee 4, Wis.

## NEW NST COMPANY CERTIFICATIONS

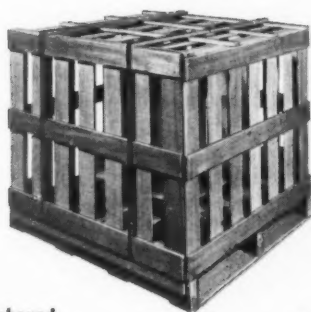
Safe Transit companies now total 264. Newest participants in the Program are: Refrigeration Appliances, Inc., Chicago, Illinois; Taylor Metal Products Co., Mansfield, Ohio; Westinghouse Electric Corp., Cleveland, Ohio; Addison Products Co., Addison, Michigan; Aerosol Company, Inc., Neodesha, Kansas; Westinghouse Electric Corp., Elevator Div., Jersey City, New Jersey; All-Steel Equipment, Inc., Aurora, Illinois; American Chain & Cable Co., Inc., Penna., Lawn Mower Div., Exeter, Penna.; Westinghouse Electric Corp., Kansas City, Missouri; The Hall China Co., East Liverpool, Ohio; UARCO, Inc., Chicago, Illinois; and Westinghouse Electric Corp., Micarta Div., Hampton, South Carolina.

A complete listing of Safe Transit Certified Companies (as of date published) appeared in the November 1956 Safe Transit section.

A 17" x 23" Jumbo copy of the certification list is available on request to NST Headquarters, 1145 19th Street, N.W., Washington 6, D.C. or by writing to Special Services Editor at Dana Chase Publications.



PALLET BOXES — Wirebound

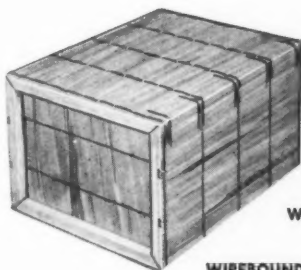


PALLET BOXES — Hinged Corner



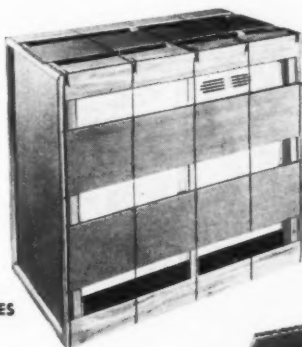
CLEATED BOXES

*We make 'em all*

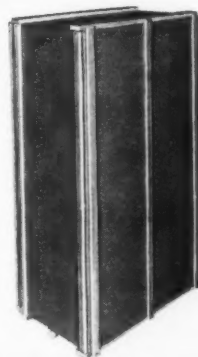


WIREBOUND CRATES

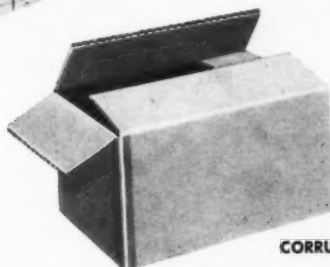
WIREBOUND BOXES



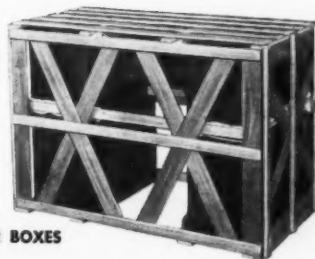
E-Z PAK CLEATED CORRUGATED  
(Watkins Type)



CORRUGATED



HINGED CORNER CRATES OR BOXES

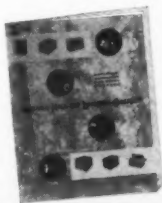


*you can be sure . . . .*

that recommendations from Chicago Mill are based on impartial, unbiased decisions because we manufacture the most diversified line of shipping containers in the country!

*Materials used include—*

Plywood • Craveneer • Corrugated • Veneer • Resawed



**FREE!**

Illustrated catalog showing the various types and applications of Chicago Mill containers, Chicago Mill's services.

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- ROCKMART, GEORGIA
- TALLULAH, LOUISIANA

## Safe Transit NEWS

→ from Page 95

Another factor that made the show successful was the large number of company executives who attended, both as representatives of exhibiting companies and as visitors."

## MATERIALS HANDLING SHOW RETURNS EAST TO PHILADELPHIA

The seventh national Materials Handling Exposition, established in 1947, will return to the East after a four-year

interval, it was announced by Clapp & Poliak, Inc., New York, the exposition management. The show will be held at Convention Hall, Philadelphia, April 29 through May 3. The last show was held in Chicago two years ago.

Concurrently with the show, the American Material Handling Society, whose membership consists of executives of firms which use various types of materials handling equipment, will conduct an extensive conference to discuss new developments in handling methods, it was announced by Herbert S. Jones, of Dominion Bridge Co., Ltd.,

Montreal, society president. The society also will hold its annual banquet during the show period and will present its annual honors and awards at that time.

The show will be the broadest and most comprehensive ever undertaken in the field, the announcements states. More than 100 different types of materials handling equipment will be demonstrated.

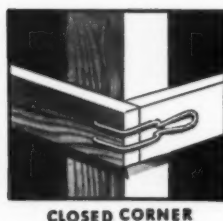
Theme for the 1957 show will be "Materials Handling, Key to Automation." More than 180 companies already have reserved space for exhibits and the total is expected to exceed 250, according to Clapp & Poliak.



**It Costs Less TO USE BIGELOW-GARVEY WRAP-AROUNDS!**

**THEY'RE TIME SAVERS—BUILT STRONGER FOR SAFE SHIPPING, HANDLING AND STACKING**

OPEN CORNER

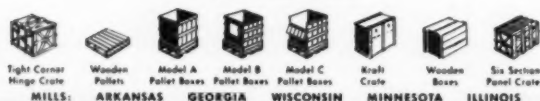


B-G Designs Wrap-Around Tight-Corner Crates to fit your product and to give you an overall lower packing cost. Ideal crate for tall and bulky items—Water Heaters—Hot-Air Furnaces—Refrigerators, etc.

Pre-tested to meet handling and transportation hazards. Protects your product and saves money in your shipping and handling costs.

B-G Containers are delivered flat, in 3 completely assembled sections. Pre-drilled nail holes. Unique Tight-Corner feature. Palletized for fork-lift handling, saves time and storage space.

B-G handling and packaging engineers will gladly call to discuss your specific shipping problems. Please write. You'll profit by our 30 years experience.



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## PERSONALS

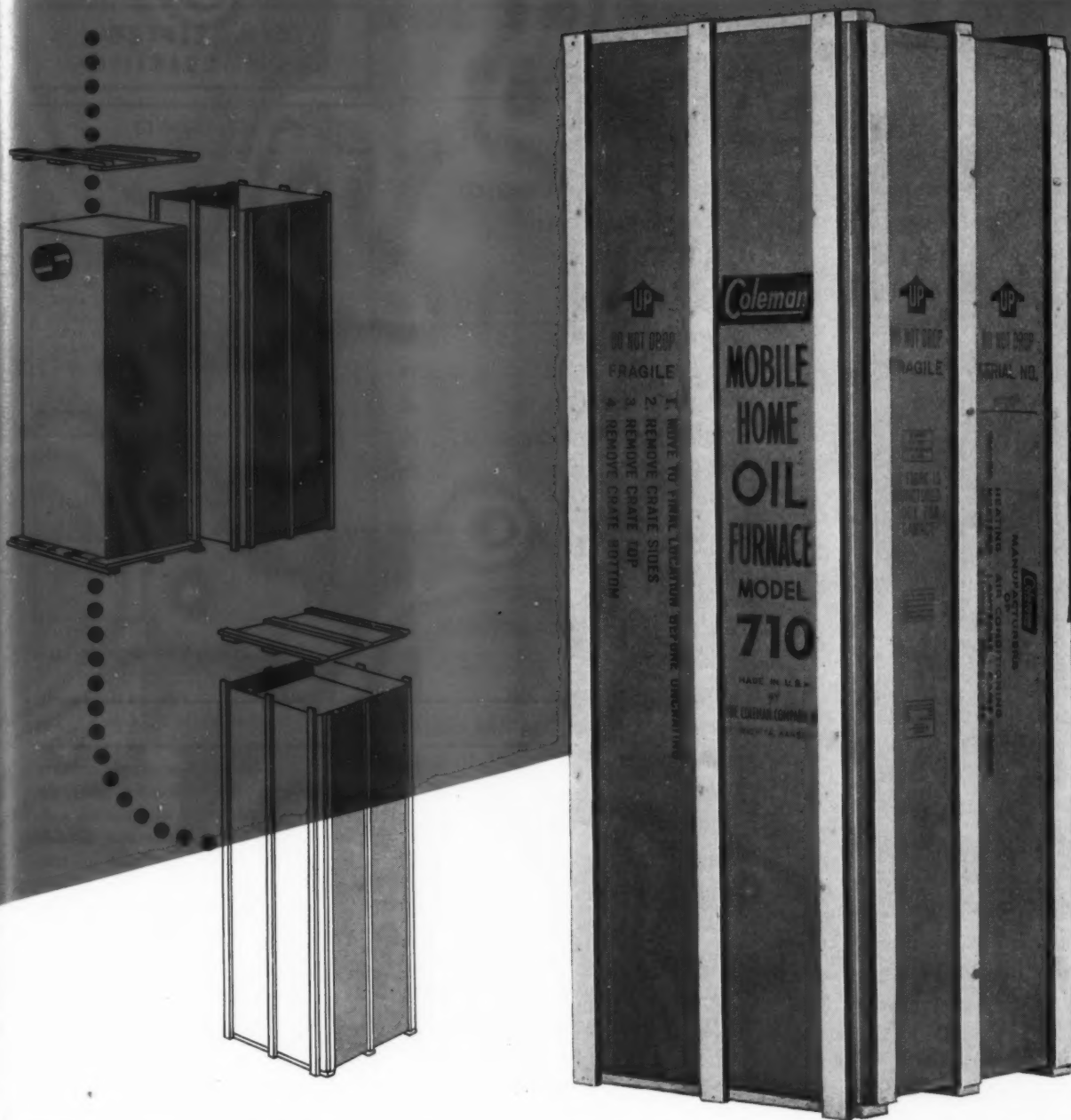
Lamson Mobilift Corp., Portland, Ore., manufacturers of industrial trucks, announces the appointment of *Karl C. Schmedicke* as manager of manufacturing. A native of Flensburg, Germany, he studied engineering at the University of Hamburg. His positions in the United States include superintendent of manufacturing at Remington Rand, and superintendent of Rollway Bearing Co., Syracuse, N. Y.

*Kenneth H. Lillis* has been appointed a packaging engineer for the Robert Gair Division of Continental Can Company, Inc., *William T. May, Jr.*, in charge of container operations for the Division, has announced.

Before joining Continental, Mr. Lillis was a packaging engineer for Western Electric Co., Inc., Kearny, N. J., and previously for the Allcraft Container Corp., Harrison, N. J.

## LEASING OF FORK LIFT TRUCKS BECOMING TREND

Many companies are meeting the "tight money" situation by *leasing, rather than buying*, materials handling equipment, it was stated recently by Herbert E. Rudy, assistant to the treasurer of Yale & Towne Manufacturing Co., speaking at the Cost Control Conference of the Illinois Institute of Technology. Rudy said the trend toward leasing industrial machinery "was dramatically illustrated during 1956 by the increased distribution of fork lift trucks made by Yale & Towne through leasing plans offered by the company's wholly-owned leasing subsidiary, The MHE Corporation."



## The Finest Products Go In Watkins Containers

They are preferred because of:

1. Low Cost
2. Stacking Strength
3. 75% Assembled—Upon Receipt
4. Ease of Assembly
5. Easy Handling
6. Minimum Storage Space
7. Protection from Dust and Dirt

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*Custom Protection . . .*

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P.O. Box 546, Wichita, Kansas  
UTILITY CRATE CORPORATION  
2019 Imperial St., Los Angeles 21, Calif.

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Working partner for enamel plant to be set up in Eastern metropolitan area in conjunction with expansion program of long established architectural sheet metal manufacturer of high credit rating. Partner must be qualified to assume full responsibility for enamel shop development and operation and to make substantial investment. All replies confidential. Address Box 2A, Dana Chase Publications, York Street at Park Avenue, Elmhurst, Illinois.

### WANTED CERAMIC ENGINEER

..... for frit sales and service work with old, established frit manufacturing firm. Please send resume of experience to Box 2B, Dana Chase Publications, York Street at Park Avenue, Elmhurst, Illinois.

### Diffusion of hydrogen ...

→ from Page 27

vacuum was being drawn on the inside. The time when the vacuum pump was turned off was considered as the beginning of the test. In a supplementary determination, the specimen was degassed. The experiment was started with vacuum on both the inside and outside of the tube, and hydrogen was let into the tube furnace.

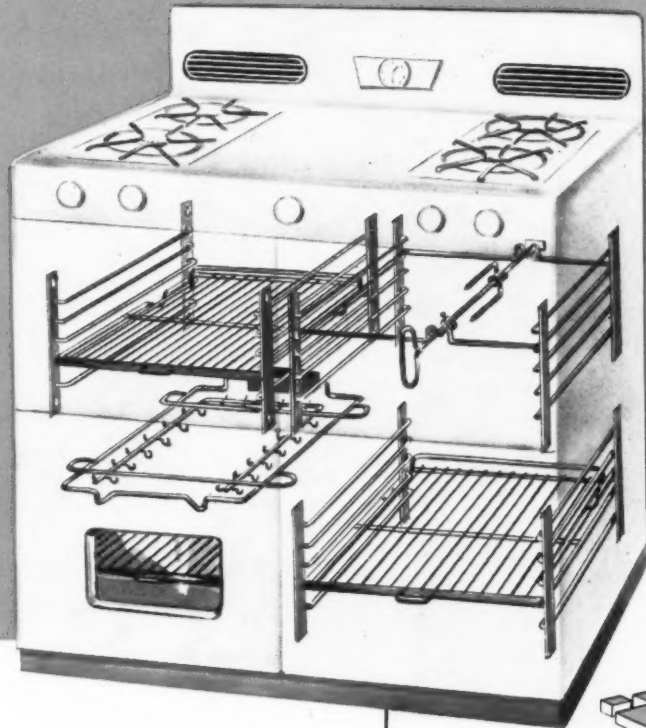
The result in this case was similar to that of the previous trials except for an initial delay representing the time required for the hydrogen to permeate the specimen wall. The experiment was repeated with the same specimen coated with the NBS A-418 ceramic,<sup>1</sup> and the results were compared for both coated and uncoated specimens.

### Conclusions from diffusion tests

The diffusion tests established that the A-418 coating can reduce the diffusion rate through a specimen to at least 1/20 of the rate through the bare nickel, even though the coating is only about 1/40 as thick as the tubing wall. Good ceramic adherence to nickel is difficult to achieve. If a chromium-containing high-temperature alloy were to be used in such experiments, the improved adherence and coverage of the coating would be expected to yield even lower diffusion rates than those obtained with coated nickel.

<sup>1</sup> Recent ceramic coatings for high-temperature alloys, NBS Tech. News Bull. 35, 145 (October 1951) Coatings for high-temperature protection of steel, W. N. Harrison, D. G. Moore, and J. C. Richmond, J. Research NBS 58, 293 (1947) RP 1773.

# SHE WANTS MORE THAN ..... BEAUTY!

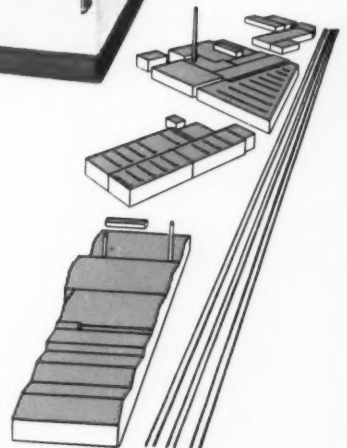


Yes . . . she wants much more than beauty alone.

She wants high styling, convenience, exterior attractiveness and—yet she must have the type of product engineering that will guarantee more years of durable, dependable, maintenance-free operation from each working part of her new appliance.

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Why not start by phoning Union Steel today? USP engineers will be happy to assist you in planning and producing a welded wire part that will make your appliance more salable.



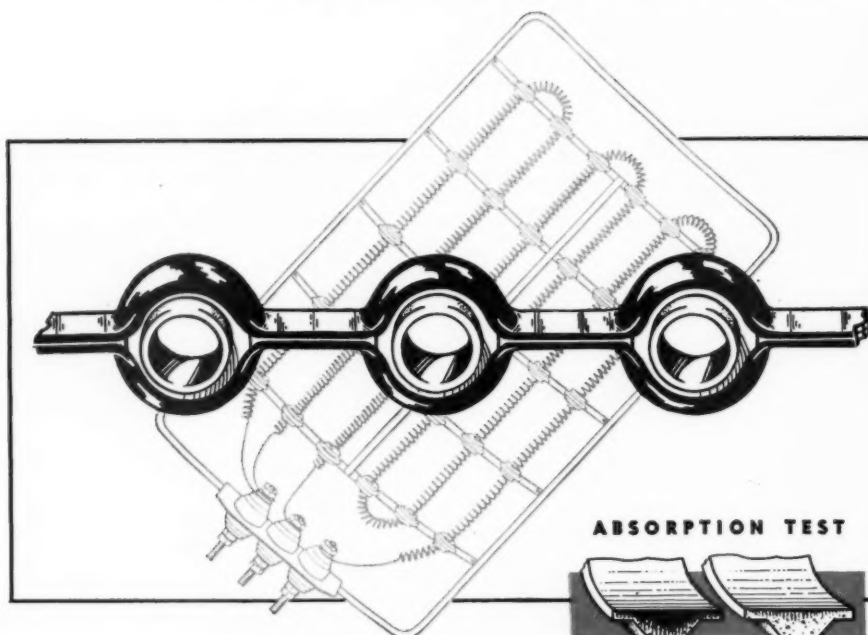
**Now...Four Big Plants to Serve You Better!**  
Union Steel has again expanded its production, engineering, sales and service facilities to guarantee faster, more complete service to you. Four big plants containing the most modern wire-forming and finishing facilities are at your disposal.



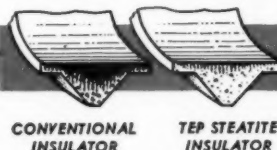
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ALBION, MICHIGAN • Contract Wire Division

# How **TEP-Heat** INCREASES HEATING ELEMENT EFFICIENCY



## ABSORPTION TEST



## MICRO AMP LEAKAGE REDUCED BY MORE THAN 50% WITH TEP UNIT INSULATORS

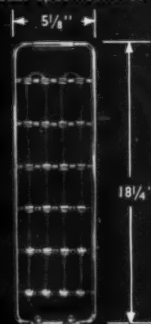
TEP unit insulators, made from porosity-controlled Steatite, reduce micro amp leakage to a minimum by controlling moisture absorption. This assures more efficient, economically operated heating elements for your products. The use of special Steatite in high temperature insulators was introduced and pioneered by TEP engineers. Independent laboratory tests prove that there is approximately 50% less leakage current (micro amps measured at Frame and Terminal Plate to Ground) with TEP units than with conventional units! For fast adaptations and economical production of heating elements for most product models, TEP stocks over 100 different insulator types. For special units, TEP engineers will design and tool special insulators for your individual requirements.

## OTHER TEP-HEAT ADVANTAGES

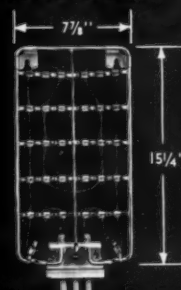
Other reasons engineers specify TEP units include: Sure Lock Insulator Supports, TEP designed to eliminate dislocating and subsequent electrical failures; "Floating Construction" for longer frame life by holding welding to a minimum, and Special Nickel Plating by an exclusive TEP process to assure a high quality chrome-like finish.

*Call or Write* for free TEP Engineering and Design Service. Let a TEP representative work with you to develop new or improve old units. There is no obligation.

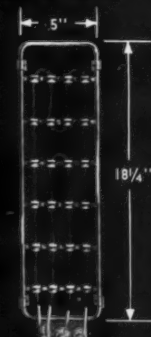
Examples of TEP Units  
Built to Manufacturer's  
Individual Specifications.



Unit for Norge Automatic  
Clothes Dryer,  
Cat. No. D-487-A



Oven Unit Engineered for  
Florence Stove Co.,  
Cat. No. 446-WB



Another Unit for Leading  
Dryer Manufacturer,  
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